

FIGURE 1A

FIGURE 1B

BEST AVAILABLE COPIE

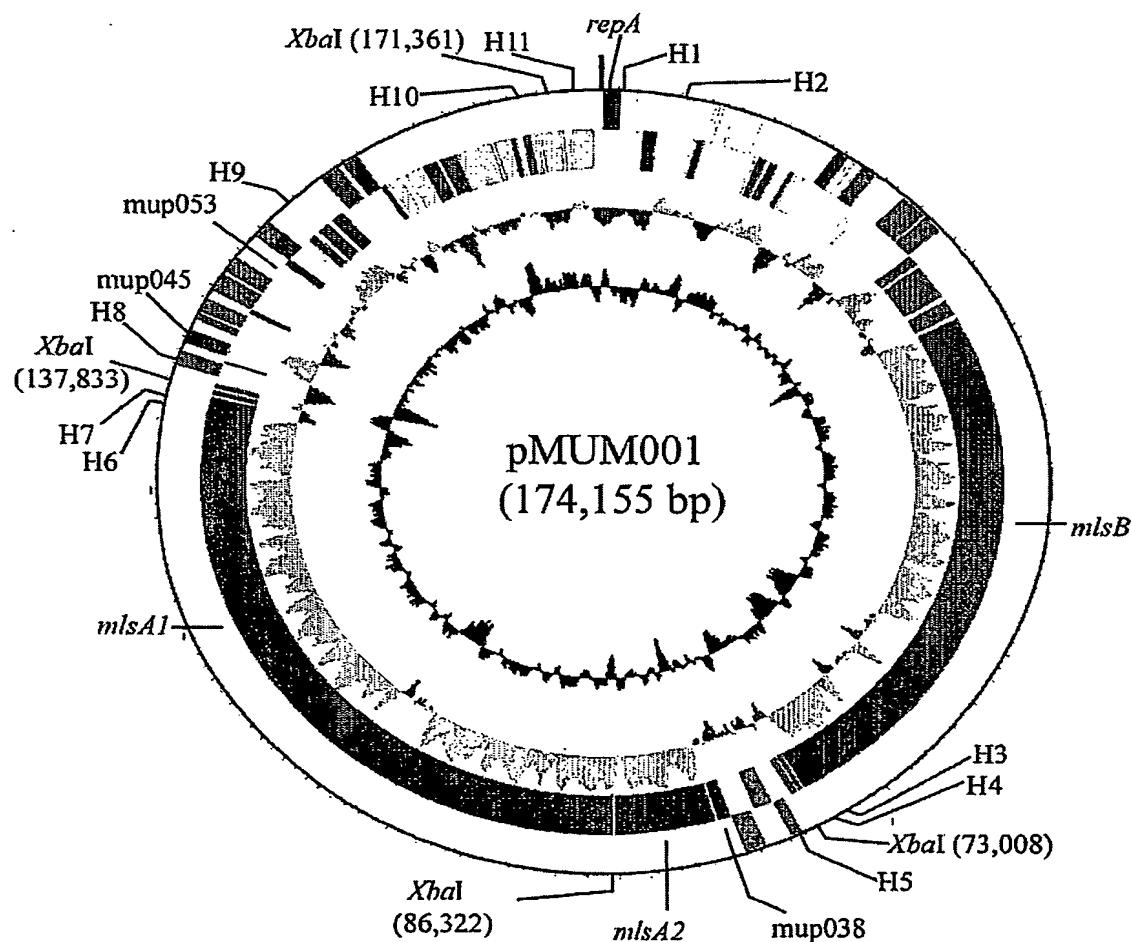
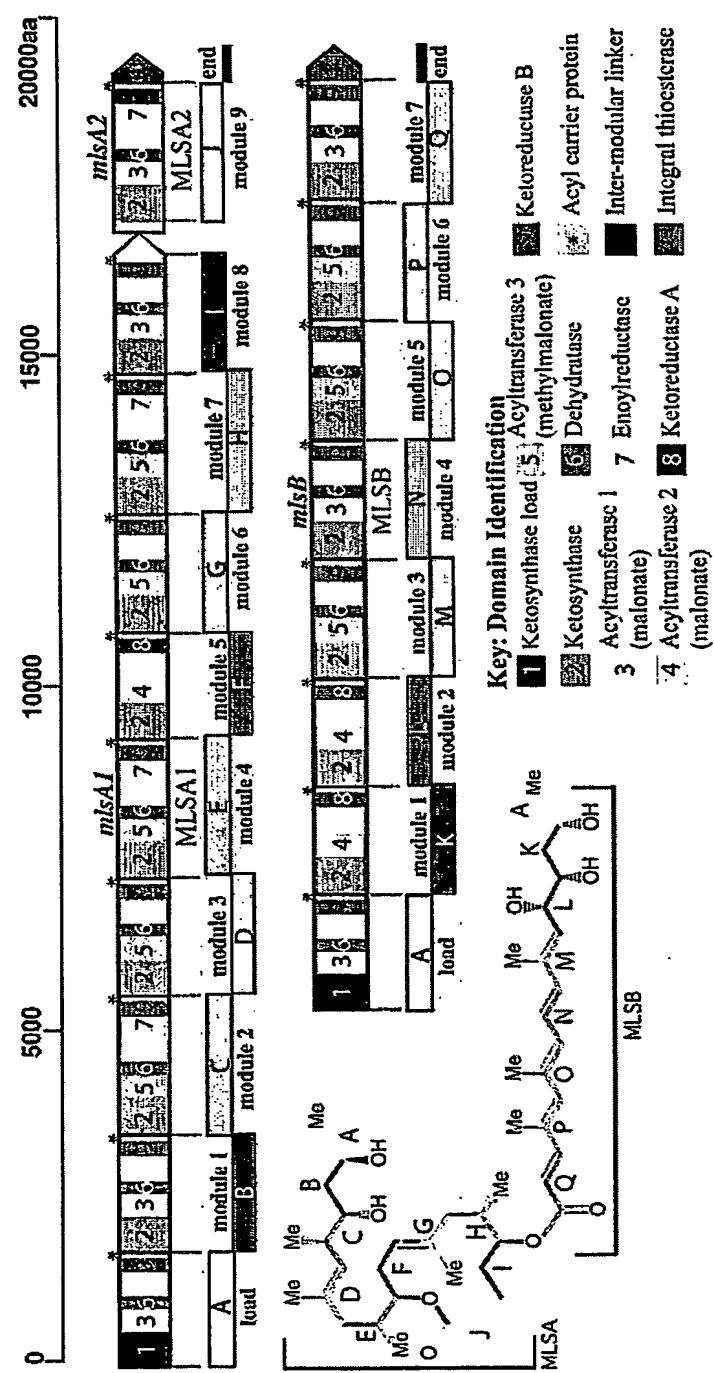
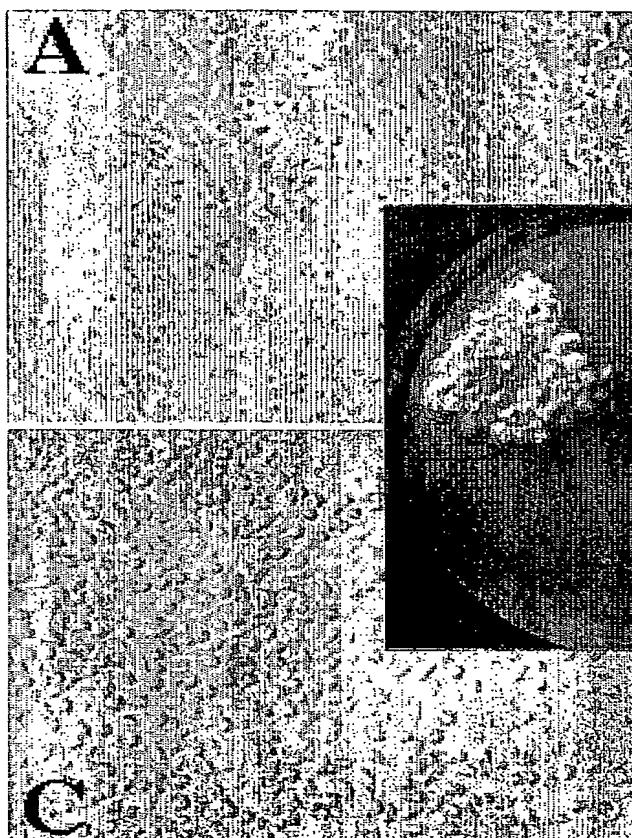
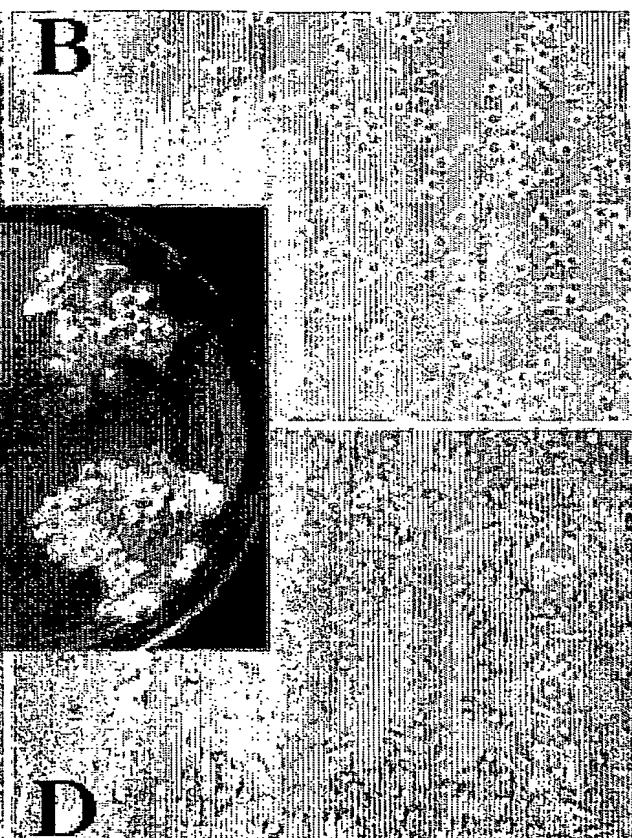


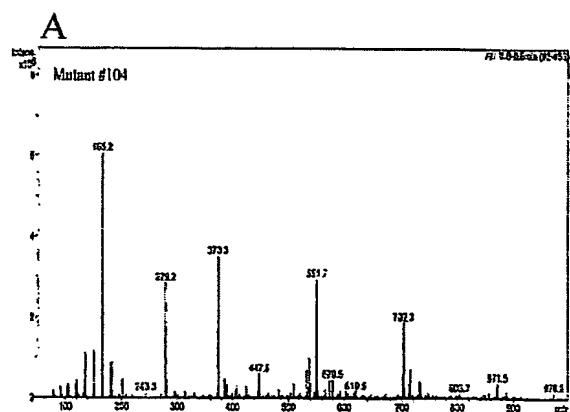
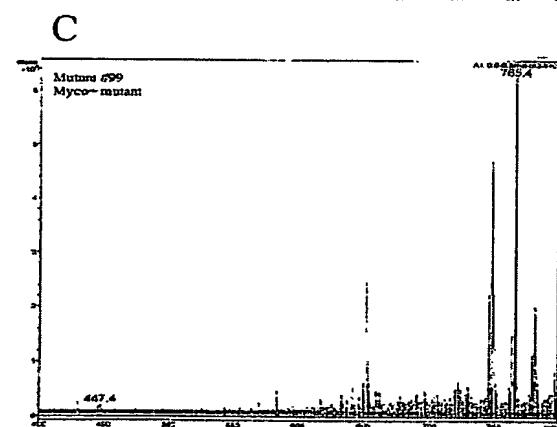
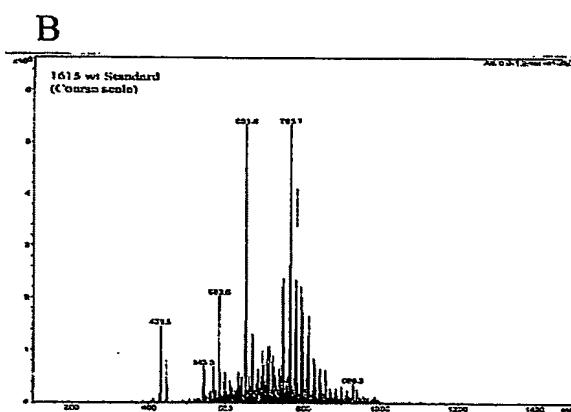
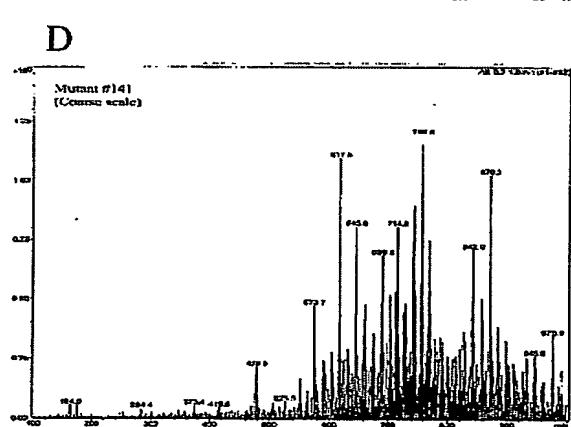
FIGURE 2

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**FIGURE 3**

**FIGURE 4A****FIGURE 4B****FIGURE 4C****FIGURE 4D**

**FIGURE 5A****FIGURE 5B****FIGURE 5C****FIGURE 5D**

## Ms1A1 gene

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FIGURE 6(continued)

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FIGURE 6(continued)

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 20051 tcagccccacg caccacaacca tggtaaaacg aacacgcgt cgaatcagcc  
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 21451 atccacatcc cccgcctgac cccgacacccgc agtgacgggt cgctcaactgc  
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FIGURE 6(continued)

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 24 151 accaggattt agcaccacacg cggaaaacaac cacgacacaaa cgcgtcgatc  
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 24 701 cactgaccca gctgtggca cgggtggacg gcaagatcac ttgcggccca  
 24 751 gttaaacggcc cggcttagcgc tgggtctcc ggcgtatcca cagcgatcac  
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 25 251 cagcccatcc tggaaatgtt tttactgttca gggccggccccc ctcacactgc  
 25 301 ccacccatcc ttccatcgatc cagcgttact ggtgttgc caccgcgtt  
 25 351 gatttcagcg gggccaaatc ccaacgcgtt gatccgttgc tagacaccgc  
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FIGURE 6(continued)

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FIGURE 6(continued)

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FIGURE 6(continued)

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FIGURE 6(continued)

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 49451 tcacactgct cgacacccgac gacaacacca acagcagacac cctcaccacc  
 49501 gcccctaaccc tgccaaacccg cgaaaacccaa ctggccatac gccgcgacac  
 49551 catccacatc ccccgcttga ccogacacag cagtgcacggt ggcgtcactg  
 49601 cggccgtgg gtagatctt gagggcacgg ttgtgtatcac cggggggacc  
 49651 gggacgctgg gtgccttggt cgccgagcat ctggttctg cccatggtgt  
 49701 cccgcattctg ttgttgcacct cgccggcgcc acctcaggcc cacggtgcca  
 49751 ccgatctgca gcagcggctc accgatctag gtgctcatgt caccatcacc  
 49801 gcctgcata tcagcggacc cgaaggactg gccgcctgg tcaattcagt  
 49851 gcccacacaa caccgtttaa ccgcggtagt gcacacccgc gcggatttgg  
 49901 cccgacacccccc ggtcaccggag ttgacccggcg atcaactcga ccaggtgcgt  
 49951 gcccccaaaa tcgacgcggc atggcagctg caccacatc cctacgaaca  
 50001 caacctgtct gcattcatca ttttcgtc catggccggaa atgataggca  
 50051 gtcccggtca gggtaactac gccgcagccca acaccgcgtt agatgtctc  
 50101 gccgactacc gccacccgcct gggcttgcgc ggcacccgc tggctgggg  
 50151 ctactggcag actcacacccg gtctcaccgc gcatctaacc gatgttagatc  
 50201 tagccgcattt gacccgcctg gtttgcatttgc ccatgcacc cagccacccga  
 50251 ctggccctgt tcgatgcgc cctgcaccacc ggacagcccg tttcgatacc  
 50301 cggccgcattt aacacccaca ccctggcccg acacccgc gacaacaccc  
 50351 tggcccgat cctgtctgcg ctgatcatca caccacccggc cggggccggcc  
 50401 tctggcccaa ccgatctcgc tgccgcctc aacggactta gcccccaaca  
 50451 gcaacaacaa acactggccca ccctcggtgc cggccacc cccaccgtgc  
 50501 tggccacca caccacccggaa agcatcagcc cagccaccgc gttcaaagac  
 50551 ctggaaatcg attcgctgac ccgccttggaa ctgcgcacaca ccctcacc  
 50601 caacacccggc ctggatctgc ccccccacccatcttcgtat caccacccac  
 50651 ccacccgcgtt aacccaaacac ctgcacaccc gactcacaca aattgagagc  
 50701 cccaaattccg aagactcgat gctgaacctt aaaaatttgg accgaatttga  
 50751 atcatatatac ttcagaattt cgggagaaga tcgagctcac gtaatcgcta  
 50801 atcggttacg gtcatttctc tggaaatggg atggcaccgg tagtccagaa  
 50851 ttacccatct tgaatcgccaa acagacgatg agctgtttc  
 50901 cctagcaaac atgtttcgca ctccaaaccag cggaaatttca cctactctag  
 50951 aaggccggccg tgggtcaac tga

FIGURE 6(continued)

## MlsA2 gene

1     gtggtgtcaa ctgaagaaaa cctacgcgtt tacttaaaac aggtcatcac  
 51    agacctccac caaatgcagg cacgtctgcg gaagatcaa aagcagagat  
 101   cagagcgggt ggcgggtggg gggatggcgt gtcgtttccc cgggggtgtc  
 151   gcatcagcgg atcagttgtg ggacttggg atcgctggcc gtatgtggg  
 201   ggtaatttt cggccgatc ggggttggg tggaggggaa ctgtttgatc  
 251   ccgatccgga cgcggcgcc aaaacctaca cccgttacgg cgcgttcctt  
 301   gacgatgcgg cagggtttga tgccgggttc tttggatct ctccacgggaa  
 351   ggcacgcgcg atggacccccc agcagcggct gctgtggag gtgtgtggg  
 401   aagcgctaga aaccgcgggtt attccgcgc acaccttgcg cggcacctcc  
 451   accgggtat tcgtcgagc ctggggccag tcctacggcg ccaccaactc  
 501   cgatggcgct gagggttatg cgatgaccgg cggctcgact aegtcatgt  
 551   ccggccgtat cgctacacc ttggccctag aagggtccagc gatcaccgtt  
 601   gacaccgcct gtcgtcatac gctgtggca attcacctgg cctgccaatc  
 651   cttacgcac aacgaatccc agctagact ggccggccgc gtcaccgtga  
 701   tgagcacacc tgccgttttcc accgaggtttcc cccgccaacg cggcctggcc  
 751   ccagatggac gtcgcaaagc cttccggct accggccatg gcaccggctg  
 801   gggtgaaggc gccgcgggtt tggcccttga acggctctcc gaggccggcc  
 851   gcaacaacca cccgggtcctt gcgatcgctg ctggatcgac gatcaaccaa  
 901   gacggcgcac ccaacggact gaccgcaccc cacggccctg cacaacaacg  
 951   cgatcaac caagcactag ccaacgcggg cctcaccac gaccaggctg  
 1001   acggcgtcga agcccacggc accggcacca cactgggtga ccccatcgaa  
 1051   gccagcggcc tacacgcaccc ctacggccac caccacacgc ccgatcaacc  
 1101   gttttgctg ggatccatca aatccaacat cggccacacc caagccggcc  
 1151   ccggccgcgc cgggtgtggc aagatgtacc aagccatcac ccacggccacc  
 1201   ttggccgcca ctttgcacgt cgaccaaccc agccccacca tcgactggtc  
 1251   cagggcaca gtcggactcc taaccgagcc catccatgg cccaaacaccg  
 1301   accacccccc caccgcggcg gtgtccatcat tcggcatcag cggcaccaac  
 1351   gcccacctca tcctccaaaca accccccacc cccgacacca cacaacaccc  
 1401   caacaccaca acagggtctg atccgcagt gggttctgtat tcgcagtg  
 1451   gttctgatcc cgcaatgggt gtactgggtgt ggccgttgatc agcgcgttca  
 1501   gcccggggtaaagcgcaca agcggccctgt ctgtaccacg atctcagcgc  
 1551   ccaccccgat ctggatccga tcgatgttagc ccacagcctg gtaaccacac  
 1601   gcagccacca ccccccacccg gcccacccatca ccaccacgat tgacccacc  
 1651   agcgaaaaca accacgcac aaccgatgcg ctggccgcac tgacccgc  
 1701   ggccaacaac ggcacacaccc ccctgtcgatc cagaggcctg ctgacccac  
 1751   agggcccccgg caaaacagtg ttctgttcc ccggacacagg cagtcaatac  
 1801   cccgccatgg ggcagatct ctaccgcaccc ttccccgtgt tcgcacccgc  
 1851   cctcgacgag gtcgctgcgg cgctgaaccc gcatctcgat gtgcgttg  
 1901   ttgaggtat gtcagccaa caagacactg ccatggcgca actgctggac  
 1951   cagacccat atgcacaacc ggcgttggc ggcgtggaa ccgtctaca  
 2001   tcgattgttc acccacgcgg gtatccaccc ggactacctg ctggccact  
 2051   ccatcgagaa actcaccgcg gcatacgccg cccgtgtgt gtcactgcaa  
 2101   gacgcagcca ctttgggtcac aagccgagga cgactgatgc aatcctgcac  
 2151   gcccggccgg acgatgtctg cactacaacg cagcgaagca gaagtacaac  
 2201   cgctgttga aggccctagac cacggcgatc ccatcgccgc gatcaacgg  
 2251   gcaacgtcga tcgtactgtc aggagatcac gacgcctcg aacaaatcg  
 2301   cgagcacttc attaccacccat atcgacgtac caccgcactg caggtcagtc  
 2351   acgcttcca ctctccacat atggacccca tcctcgaaaca attccgcac  
 2401   atcgccggcc aactcaccc cagcgcaccc accctgcacca tcttgtccaa  
 2451   cctcaccggg cagatgcggc gccacggacca actcgcctca cctgactatt  
 2501   ggacccaaaca gotacgtaac actgtccgg gcatggatc acatggcc  
 2551   ctgctcgccggg cgggtgagca ggtttctgt gaaatccac ctcacccgg  
 2601   gttgacacaa ggcgtacccg acaccgtcga acaagccggc ggcggccgg  
 2651   cagcgtgcc agctctacgc aaggatgcgc ctgatgtgt cgcgttcgtc

FIGURE 7

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2701 gcagcactcg gccagctgca ctgccatggc atcagccat cctgaaatgt  
 2751 tctttaactgc caggcccgcc ccctcacact gcccacctac gctttccagc  
 2801 atcagcgatcc ctggctgctg cccaccgctg gtgatttcag cggggccaaat  
 2851 acccacgcca tgcacatccgt gctagacacc gccaccgaaac tggccgaaaa  
 2901 cccggatgg gtgttacccg gccggatcag cccacgcacc caaccatggc  
 2951 taaacgaaca cggcgatgaa tcagccgtgc tggatccagg caccggattt  
 3001 gtcgagctag cgctgcgtgt cgctgaccgt gccggatatt cctcggtcaa  
 3051 cgaactgatc gtgcacaccc ccctgtact cgctggccac gacaccgccc  
 3101 atctacagat caccgtcacc gacaccgtg acatggggcg gcaatctt  
 3151 aacatccact cgcacccaca tatcgccat gacaacacca ccacccggcga  
 3201 tgaacaaccc gagtggggtcc tgcacatcccg cgcagtcctg accgcacaaaa  
 3251 ccaccgacca caaccaccc cccctaacgc ctgtggccgtg gcotccaccc  
 3301 ggcacagccg cgatcgagggt ggatgacttc tacgacgacc tggctgcaca  
 3351 gggctacaac tacggcccg cattccaagg tggcaacgg atatggcgtg  
 3401 accacgccc acccgatgtc atctaccccg aagttgaact acccgaaagac  
 3451 accgacatcg aeggctacgg catccacccc gcccatttcg acggcgcttt  
 3501 acaccccta ctcgcccgtga cccaaaccccc caccacgc accgatgaca  
 3551 ccaacacccgc agacaccgggt gaccagggtgc ggctgccta cgcccttacc  
 3601 ggcacatgtt tgcacgcccac ccacccccc cgttgcggg taeoggctgac  
 3651 ccgtaccggc gccgatgcca tcaccgtca caccagtgc accaccggag  
 3701 ccccggtggc gatcatcgac tcattgtatca cccggccccc caccacccgc  
 3751 acagggtctg ctccggcaac cacagcagct ggcctactac acctgagctg  
 3801 gccaccacac cctgacacca cgaccgacac cgacacccgac accgatgccc  
 3851 tgcggatca ggtgatcgcc gaacccactc aacaactgac ccgttacccgt  
 3901 cacgacccatc acaccaggcac cgacccgtac accagcacca ccgaagcaga  
 3951 cgtgggtgtg tggccgggtac cgggtccccag caacgaagag ctccaggc  
 4001 accaaggatc cgacaccggcg gtgttttctc ggatacacac cctgaccggc  
 4051 caaacactta ccgtgggtgca ggactggctc actcaccaccc acaccaccgg  
 4101 caccggactg gtcacatcgatca cccggccacgg cgtagcacc accgtccac  
 4151 acccggtccc cgacccatgtt caccggcgac tggggggctt gatccgc  
 4201 gcccggggcc aacacccccc acgtttcaca ctgctcgaca ccgacgacaa  
 4251 caccacacgc gacaccctca ccacccccc aaccctgcca acccgcgaaa  
 4301 accaactggc catacgccgc gacaccatcc acatccccccg cctgaccggc  
 4351 accgctgtcc tgacaccacc ggacaggccg ccctggccgc ttgacaccac  
 4401 cggcaagggt gatctggcca acctggccct gctaccgacc gcccacactg  
 4451 ccctggccctc tggacaaatc cgtatcgatg tccggccgc tggttgaat  
 4501 tttcacgacg tggtcgtcgc gttggggcta atccccggc acggattcgg  
 4551 cggagaagcc gcccgggtga tcagcgagat cgggtccgcgt gttacggat  
 4601 tcgcccgtgg tggatcgatc accggcatga cctgtctgg tgcgtttgcc  
 4651 cccagcactg tgcgtatca ccgcatgggt atgacgatcc cggccgggtg  
 4701 gtccttcccc caagccgcat ccataccggt ggtattccgt accgcctaca  
 4751 tcgctttggc cgagatctcg ggcctaagcc gaggggcaacg agtgctgatc  
 4801 catgcccggca ctggcggtgt gggatggct gcgattcaat tggcacacca  
 4851 tttgggtggc gaagtttccg ccacccggcgg cggccggaaa tggagcacc  
 4901 ttgaggcact gggggatcccg cgccgaccata tcgcttcctc gctactctg  
 4951 gactttcca acgcattctc cgatccacc aacggccgcg gtgttgcgt  
 5001 cgtattgaac tgcctcgtgt gtgatttcgt cgaagcatcc ctggccctgc  
 5051 tggcccgccg tggccatttc gtcgaaatcg gcaaaaaccga catccgtat  
 5101 accgagggtca tcgcccggca ccatccccggc gtcatttacc gcccggccg  
 5151 tctgctcagc gtctcccccgtt atcacatcca gcgccacactg gcccacactgt  
 5201 ccccaactgtt tggccaccgac accctaaaac ccctaccgac cactaattac  
 5251 agcatctacc aagccatctc ggccttacgt gacatgagtc aagcccgatc  
 5301 cacaggcaag atcgtgctca ctggcggtgt ggttgcgtt gctgaggcc  
 5351 cgggtttgtat caccgggggg accggggacgc tgggtgcctt gttcgccgag  
 5401 catctggttt ctggccatgg tgcgttgcgt ctgttgcgtt gctcgcggcg  
 5451 cggacactcg gcccacgggtg ccaccgatctc gcaacggccggc ctcaccgatc  
 5501 taggtgctca tgcaccatc acggccgtcg atatcagcga ccccgaaagca

FIGURE 7(continued)

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5551 ctggccgccc tggtaattc agtccccaca caacaccgtt taaccgcgg  
5601 agtgcacacc gcccggat tggccgacac cccggtcacc gagttgaccg  
5651 gcgatcaact cgaccagggt ctggccccc aaatcgacgc ggcattggcag  
5701 ctgcaccaac tcacctacga acacaacctg tctgcattca tcatgttctc  
5751 gtccatggcc ggaatgata gcaagtcgg tcagggtaac tacgcggcag  
5801 ccaacaccgc tttagatgtct ctcggact accggccaccg cctgggcttg  
5851 cccgcgacca gcctggcctg gggctactgg cagaccgc cccgtgtcac  
5901 cgcgcataaccgatgtat atctagcccg catgaccgc ctggggttga  
5951 tgcccatcgcc caccagccac ggactggccc tggtcgatgc cgccctcgcc  
6001 accggacaggcccgat accccggccg atcaacaccc acaccctggc  
6051 ccgacacgc cgcgacaaca ccctgaccc gatcctgtct gcgcgtatca  
6101 ccacaccacg ggcggggcgc gcctctgcgc caaccgatct cgctgcccgc  
6151 ctcaacggac tttagccccca acagcaacaa caaacactgg ccaccctcg  
6201 ggcgcggcc accggccaccg tgctggcca ccacacccca gaaagcatca  
6251 gcccagccac cgcgttcaaa gacotcggaa tcgattcgct gaccggccctt  
6301 gaactgacca acaccctcac ccacaacacc ggctggatc tgccccccac  
6351 cctcatcttc gatcacccca caccggatgc gctaacccaa cacctgcaca  
6401 cccgactcac ccaaaggccat accccggatcg gaccaattgc gtccctgcta  
6451 agccacgcga tcgatgaggg caaattccgt gccggcgctg acctattgat  
6501 ggcgcatcc aatttgaacc aaagttttag caaatatggct gaactcaacc  
6551 agctccggc cgtgacggac atagctgacg cgtctccgtg tgggctactc  
6601 accctgatct gcatctctac ctcagagaat gtagtacgctc gcctcgctgc  
6651 tgcgaacatt cattcactga ccttcgctga aattgcggcg cccggcttt  
6701 acgacgcgca gtcggccaaat tcgatagaga cgtcgccaga ggcgctggca  
6751 actgccccatca caggcgccata cgccaaatacg tccattgttc tggtagcgca  
6801 ctccattgtc tgcgagctag ctcaggcaac gatgacacgt ctacaagacg  
6851 ctgacatcgat cttgtgggt ctgggtctgt tggatccact cgaaggact  
6901 aacagactg aagattatgt ggagacagtc ttgactcgaa tcgagcatat  
6951 caatgcaccc agggtcggag tagacggta cttgccccc ctggggccct  
7001 atctccaatt ccacgaagac cggccaaatac caataccgaa aacgcggcac  
7051 atgacactgc actcgacac gaaaattgac cgtgccccaaa caccatgaa  
7101 cttattacaa gatgaggcag cggtgaccgc cctcaaaaata gggaaactgg  
7151 tgaacgcac agggagatgc gcaactaacat tgagagatgg acccgattc  
7201 ttggcaggcccgctctgt caacatgagg tga

FIGURE 7(continued)

## MlsB gene

1    gtgatcttcg gagatgctca caaaaactgc aggggaggtc gggtgttggg  
 51    ttagtgcagtc gcagtggtcg gaatgtcttgc cgggttccct ggccatctg  
 101    atccggacgc tctgtggcg ctgcgcgag acgggatcag tgggtcgat  
 151    gagataccctt ctgcacgttgc gaatttagac ggcctcggtt ctcaccgact  
 201    gaccgatgag caacgatcag cgcttcggca tggcgccttt cttgatgacg  
 251    tcgaagggtt tgaccccgcg ttcttcggaa ttaacccttc cgaagctggg  
 301    tcgatggatc cgcagcaacg attgtatgcattt gaaactgaccc gggcagcact  
 351    cgaagatgct cgaatcgtgc cagaacatctt ccgggttagc agtagcgggg  
 401    tggttaccgg cgccatgagc gatgattaca cgaccgggt gacctaccgc  
 451    gcagcgatga ctgcacatac ctttgcgggg actcaccgca gcctcatagc  
 501    caaccgtgtc tcctacacac tcgggtctacg cggacctagt ttggtcatcg  
 551    ataccggca atcgtcctca ctgggtggctg tgacacgtggc aatggaaagc  
 601    ttgcgcagag aagaaaacttc acttgctatc ggggtggta ttcaccttaa  
 651    cctcagcctc gccgccccac tgagcgcagc acacttttga gccctttcac  
 701    ctgacggacg ctgctacacc ttgcacgcac gtgcacacgg atacgttgcgt  
 751    ggcgaaggcg gcccgtcg ctgtctcaaa cgtctcaacg acggccctagc  
 801    cgacggcaac catatttact gtgtatccg cggcagctca gtcaacaacg  
 851    acggccccac tcaagacttg acagcgccccg gagtcgacgg ccagcqtc  
 901    ggcgtccttc aagcttatga gcgagccgaa atcgacccct cagaagtcca  
 951    atacgtcgag ctacatggca cccggaccccg actcggcgat cccaccgaa  
 1001    cccactcgct tcactccgtc ttccgcacat ccacggtccc ggcagcccc  
 1051    ctgctagtcg ggtcaatcaa aaccatatac ggtcacctcg aaggcgcgc  
 1101    aggaatcttc ggcctaatac agactgcctt tgccgttcat catgc  
 1151    ttccccccag cctcaactac acgggttccat accaaaaat cccgctagag  
 1201    cagctaggc tccgcgtcca aaccactctc agtgaatggc cggactttaga  
 1251    caaacccgcta acggccccgg tgcacatctt ttccatgggt ggcaccaacg  
 1301    cccacccat cctccaaacaa ccccccaccc cccgacaccac acaaacc  
 1351    aacccccacaa cagggtctga tccgcgttg ggttctgatc cccgactgg  
 1401    tgcgttgcgttgcgttgcgttgcgttgcgttgcgttgcgttgcgttgcgtt  
 1451    aaccccccgg tctgtaccag catctcagcg cccaccccgatc tctggatcc  
 1501    atcgatgttgcgttgcgttgcgttgcgttgcgttgcgttgcgttgcgttgcgtt  
 1551    cggccaccatc accaccagca ttgagccatc cagcgaaac aaccacgaca  
 1601    caaccgatgc gctggccgca ctgcacgccc tggcaacaa cggcacacac  
 1651    cccctgtga gcaaggccct gctgacccca caggccccgg gcaaaac  
 1701    gttcgttgcgttgcgttgcgttgcgttgcgttgcgttgcgttgcgttgcgtt  
 1751    tctaccgcctt attccccgtt ttccgcacat cctcgacatc ggtcgctcg  
 1801    ggcgtgaacc cgcacatctcga tgcgttgcgttgcgttgcgttgcgttgcgtt  
 1851    acaagacact gccatggcgc aactgctggaa ccagacccatc tatgc  
 1901    cggcgttgcgttgcgttgcgttgcgttgcgttgcgttgcgttgcgttgcgtt  
 1951    ggtatccacc cggactactt gctaggccac tccatcgatc aactcaccgc  
 2001    ggcatacgcc gcccgtgtgc tgcgttgcgttgcgttgcgttgcgttgcgtt  
 2051    caagccgagg acgactgtatc caatccgtca cggccggccgg gacgatgc  
 2101    gcaactacaag ccagcgaac agaagtacaa cccgttgcgttgcgttgcgtt  
 2151    ccacggccgttccatcgcccg cgatcaacgg agcaacgtcg atcgtactgt  
 2201    caggagatca cgcacccgttgcgttgcgttgcgttgcgttgcgttgcgtt  
 2251    gatcgacgttgcgttgcgttgcgttgcgttgcgttgcgttgcgttgcgttgcgtt  
 2301    tatggacccatccatcgccatccatcgccatccatcgccatccatcgccatccat  
 2351    tcagcgacc caccctgccttgcgttgcgttgcgttgcgttgcgttgcgttgcgtt  
 2401    cggccacccaccatccatcgccatccatcgccatccatcgccatccatcgccatccat  
 2451    cactgtccgg ttccatcgccatccatcgccatccatcgccatccatcgccatccat  
 2501    aggttttcctt ggaactttca cctcaccggc tggacccaaac agtacgtaa  
 2551    gacaccgtcg aacaaggccgg cggccggccgg gcaacgtcg cagctctacg  
 2601    caaggatcgccatccatcgccatccatcgccatccatcgccatccatcgccatccat  
 2651    actgcccacatccatcgccatccatcgccatccatcgccatccatcgccatccat  
 2701    cccctcacac tggccacacttgcgttgcgttgcgttgcgttgcgttgcgttgcgtt  
 2751    gcccaccgttgcgttgcgttgcgttgcgttgcgttgcgttgcgttgcgttgcgttgcgtt

2801 tgctagacac cgccaccgaa ctggccgaaa accgcggatg ggtgttcacc  
 2851 ggccggatca gcccacgcac ccaaccatgg ctaaacgaac acgccgtcga  
 2901 atcagccgtg ctgttcccga acacccgatt tgtcgagcta gcgtgcacatg  
 2951 tcgctgaccg tgccggatat tcctcggtca acgaactgat cgtgcacacc  
 3001 cccctgctgc tcgctggcca cgacaccgcg gatctacaga tcaccgtcac  
 3051 cgacaccgat gacatgggccc ggcagttctt taacatccac tcgcacccac  
 3101 atatcgccca tgacaacacc accaccggcg atgaacaacc cgagtgggtc  
 3151 ctgcatgcca ggcagtcctt gaccgcacaa accaccgacc acaaccaccc  
 3201 cccccctaactt cctgtgccgt ggcctccacc cggcacagcc gcgatcgagg  
 3251 tggatgactt ctacgacgac ctggctgcac agggctacaa ctacggcccg  
 3301 acattccaag gtgtgcaacg gatatggcgt gaccacgcca caccgatgt  
 3351 catctacgccc gaagttgaac taccggaaaga caccgacatc gacggctacg  
 3401 gcatccaccc cggccattttt gacgcgcgtt tacacccctt actcgccctg  
 3451 acccaaccccccc caaccaacga caccgatgac accaacacccg cagacaccgg  
 3501 ggaccagggtg cggctgccc acgcctttac cggcatcaat ttgcacgcca  
 3551 cccacccaccc cggattgcgg gtacggctga cccgtacccg cgccgatgcc  
 3601 atcaccgtgc acaccagtga caccacccgaa gccccgggtgg cgatcatcga  
 3651 ctcattgatc acccgcccccc tcaccaccgc cacagggtct gctccggcaa  
 3701 ccacacgacg tggctacta cacctgagct ggccaccaca ccctgacacc  
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FIGURE 8(continued)

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FIGURE 8(continued)

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FIGURE 8(continued)

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FIGURE 8(continued)

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 25651 tacaccgtt acggcgcgtt cttgacgat gcggcagggtt ttatgccgg  
 25701 gttcttggg atctctccac gggagggacg cgcgtggac ccccagcagc  
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FIGURE 8(continued)

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**FIGURE 8(continued)**

34101 acagggtac aactacggcc cgacattcca aggtgtgcaa cgatatggc  
 34151 gtgaccacgc cacacccgat gtcatctacg ccgaaggta actacccgaa  
 34201 gacaccgaca tcgacggcta cggcatccac cccgcctat tcgacgcccgc  
 34251 tttacacccc ctactcgccc tgacccaacc ccccaacac gacaccgatg  
 34301 acaccaacac cgcagacacc ggtgaccagg tgccgctgcc ctacgcctt  
 34351 accggcatca gtttgcacgc caccacgccc acccgattac ggttacggct  
 34401 gaccgttacc ggcgcccgt ccattaccgt gcacaccgt gacaccaccc  
 34451 gagcccggt ggcgatcatc gactcattga tcacccccc cctcaccacc  
 34501 gcoacagggt ctgctccggc aaccacagca gctggctac tacacctgag  
 34551 ctggccacca caccctgaca ccacgaccga caccgacacc gacaccgatg  
 34601 ccctgggtt tcaggttacc gccgaacccca ctcaacaact gccccgtac  
 34651 ctgcacgacc tacacaccag caccgaccgt cacaccagca ccaccgaagc  
 34701 agacgtggtt gtgtggccgg taccggtgcc cagcaacgaa gagctccagg  
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 34851 cggcacccga ctggtcatcg tgacccgcca cggcgtcgc accagtgc  
 34901 acgacccgggt ccccgaccta gcccacgccc cagtgtgggg cctgatccgc  
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 35001 caacaccaac agcgacaccc tcaccacccg cctaaccctg ccaaccgc  
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 35151 gggcacgggt ttgatcaccc gggggaccgg gacgctgggt gccttgc  
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 35451 gaccggcgat caactcgacc aggtgtggc ccccaaaatc gacgccccat  
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 35651 gcttgcggc gaccgcgt gcctggggct actggcagac toacaccgg  
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 36051 catcagccca gccaccgggt tcaaagaccc cggaaatcgat tcgctgacc  
 36101 cccttgaact ggcacacacc ctcacccaca acaccggcct gatctgc  
 36151 cccaccccta tcttcgatca cccacaccc catgcgtgg cggagcatct  
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 36751 ggtccagcga tcaccgttga caccgcctgc tcgtcatcg tgggtggcaat  
 36801 tcacccgtggcc tgccaaatctt tacgcaacaa cgaatcccg ctagcactgg

FIGURE 8(continued)

36851 ccggcggcgt caccgtatg agcacacctg cggtttcac cgagttctcc  
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 37101 cggccgtca caacaacgcg tcatcaacca agcaactagcc aacgcccggc  
 37151 tcacccacga ccaggtcgac gccgtcgaag cccacggcac cggcaccaca  
 37201 ctgggtgacc ccatcgaagc cagcgccttgc cagccaccc acggccacca  
 37251 ccacacgccc gatcaacccgc tttggctggg atccatcaaa tccaacatcg  
 37301 gccacaccca agccgcgc ggcgcgcgt gtgtggtcaa gatgatccaa  
 37351 gccatcaccc acgcccaccc gcccgcacc ttgcacgtcg accaacccag  
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 37451 tccaatggcc caacacccgc caccggcgc cccggccgt gtccttattc  
 37501 ggcattcagcg gcaccaacgc ccacccatc ctccaaacaac cccccaccc  
 37551 cgacaccaca caaaacccca acaccacaac aggttctgtat cccgcagtgg  
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 38351 cgctgcttgc aggccctagac cacgc当地 gtgtgt gcatcgccgc gatcaacgg  
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 39051 ccggatgg gtttccaccg gccggatcgatc cccacgc当地 caaccatggc  
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 39151 gtc当地 cccgtcgatc cgc当地 gccggatatt cctcggtcaa  
 39201 cgaactgatc gtc当地 cccgtcgatc cgc当地 gacaccgc当地  
 39251 atctacagat caccgtc当地 gacaccgtcg atcggcccg gcaacttgc当地  
 39301 aacatccact cggccccaca tatcgccat gacaacaccat cccaccggc当地  
 39351 tgaacaaccc gagtgccatc tgc当地 gccaccgc当地 accgc当地  
 39401 ccaccgacca caaccaccc cccctaaacgc ctgtgc当地 gcttccaccc  
 39451 ggcacagccg cgc当地 gaggttgc当地 gatgc当地 tacgacgacc tggctgc当地  
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 39651 acacccctta ctc当地 cccacccccc caccacgc当地 accgatgaca

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 40951 tcgtccatgg ccggaatgtat aggcagttcc ggtcagggtta actacggcggc  
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 41751 ccagctcccg gccgtgacgg acatagctga cgcgtctcct gatgggtac  
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 42001 cactccatttgc tctgcgagct agtcaggca acgtgacac gtctacaaga  
 42051 cgctgacatc gatcttgcgtt gtcgttct gttggatcca ctgcgaaggga  
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 42151 atcaatgcac cgagggtcgg agtagacggt taccttgcgg ccctggccg  
 42201 ctatctccaa ttccacgaag accggcaat accaataccg gaaacgcggc  
 42251 acatgacact gcactcgac acgaaaattt accgtgccc aacaccaatg  
 42301 aacttattac aagatgagggc agcgttgacc gccctcaaaaa taggaaactg  
 42351 gatgaacgcac gtgggttttgc ccctctctgt caaccttgag tga

FIGURE 8(continued)

### Mup045 gene

1 gtgatttgga atgacatcta cataagtggga acggggcggt tcatcccgta  
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101 ctatcgta atccgattac atttccttca ccgaagccga tgagcccgta  
151 acagtcatgg ccacgcgcgc tgcaaccgaa ggcgtgacca cttecgagct  
201 agtatccgct gatgttggcg tcttgatata tgccgcgatc atcggcgatg  
251 cgcatcattt tgcccccgta tgcacgtcc aaagagtcc ctgggcgccc  
301 gatgcgctgg cattcgaact ttccgcagca agtaacggtg gaacacaagg  
351 catecgagtt gctgcaaaatc tcatgacagc tgacgcgtcc gtgaaagctg  
401 cactcggtt tacagcttac cggcacccga tcgatattat cagccgttgg  
451 tcgtcaggta tggtattcgg cgatggagaca gcccggccg tgcttcaag  
501 agacggcgga atggtgcgat tgattccgg gtatcacggc tcactgcgg  
551 agctagaggt tcttgcgtaga aatcgatcca acgaacgact tggcttgtg  
601 ctgcccagacg tcgggtttagg aaaataccctaa actgctatag cgccggatgt  
651 ccaagcggtt attgcgcgtt tactagaaga ggcacaaact agtattggcg  
701 agatcgacta tttcgccgtt atcggtatag gaattccaag tctcacagcg  
751 actatcttag aacccaaacgg tattcccggtt aataaaacat cctgggggtt  
801 gctaagacaa atggggccacg ttggagcttgcgatccctg ctgagcccta  
851 accacctatt cgagcagaat gtcctcaagc gcggcgacaa agtcctactc  
901 ctaggtggcg gggtgggttgcgatgacatggacatggcattgtgg ctgaaatcg  
951 catgaatccc ggcgtgccccg gacactccac ttcgttag

**FIGURE 9**

### Mup053 gene

gtgaggcaga gattgaactg gattgcggcg cacgggttgc tccgcggcac  
51 cgcgccgtta gcggcccgcc tgggcgcacgt gcagtgcgcgg ctggggcag  
101 atccccatggt tatggcaaac ccggcgccat tttgcgatga attgagggca  
151 atcgccctg tgggtgcgag ctacggcacc caccctcgctg tttagtcatgc  
201 catcgcccat gaactgcttc ggtccgaaga cttcgaagtgc gtctcgctcg  
251 gatcgaaactt gccggcacca atgcgttgc tagagcgcgcg cactcggac  
301 gatacgcccc atctgctgct gccgcccgtcg ttgctggccg ttgagggcc  
351 gaatcacacg cgctatcgca aggcaagtgc ctccgggttgc acgcccggaa  
401 cagtagccgg attacgcgat catgtcgaag agactgcgtc ggcgcgttgc  
451 gatcagctca ccgaccaggc tagtgcgtc gacatcatag cccgcgtactg  
501 ctcccagctg ccgggtcgccg tcatttgcgat catcttaggc gtgcggcgtc  
551 gagaccgaaa ccgtgttctc aagttcggtc agtggccggg gccctgcttgc  
601 gattttgggc tcacatggcg tcagcaccag cagtgccggc aagggtctca  
651 aggactccac ttctggatca ccgagcacct cgaggaattt cggtctaacc  
701 ccgggtgacga tctgtatgagt caaatgatcc acgcaagtga aaatggctcc  
751 tcggaaacac acctccacgc aaccgaagtgc cgatgtatgc ggctgggttgc  
801 gggcgccagt ttgcacaaca cgatggaccc ttaggcacac gggatttcagg  
851 tgggtgttggc cgccggccaa ctgcgggacg cgttgagtca ggcggccca  
901 ctttggccca acggcggtaga agagatctt cgggtggagc caccgggttca  
951 gctcgccggc cgaatggctc gcaaggacac cgagggtggcg ggtacccgaa  
1001 tcaagcgggg ccagctggtg ggcgtatc tggggcggtt caaccgttatc  
1051 ccgtccgtgt tcgcgcgttcc gcaccgcgtt gacatcacac gagccaaacgc  
1101 caaccggcat ctcgcattct ccgggtggccg ccacttctgc ctcgggtcc  
1151 cccttggcccg cgtcgaaaggc gaagtcggtat tgagaatgtt cttcgagcgc  
1201 ttccctgacg tgcgccgcg aggccccggaa aataagacgtt atactcgaaac  
1251 tctgcgggggt tggtcgcagc tgccgggttca gttggcgca gcacgatcg  
1301 tggctatccg atga

**FIGURE 10**

## Mup038 gene

1 atgattgttt ggcccgaagt ggtcagcaca gtggtcgacg tcgatggcgt  
51 ggcgatgtcg gcactagtcg ccgaaccga tcaggagct aaggccgtga  
101 tcttagccot gcatggcggt gccacccaacg cgccgttattt cgactgccc  
151 ggccaccgcg cgctttccct gctgcacacc ggccggcgcc cgccgattcac  
201 cgttgtgcc cttgaccggc ccggctacgg cagctggcg ggtgatcccg  
251 acgcgatgaa ccggcccccac cagcggcccg cgctggccta tggggcgctg  
301 gatcgatcc tggcgcagcg gccacgggg gcccgggtgt tcataatggg  
351 ccattcaaac ggatgcgaac tggcgatgtg gatggccacc gagacgcgcg  
401 gtgcccagct gctcggcatc gagttggctg gtaccggctg gcattatcag  
451 cccgaggccc gagaatcct gacaacggcc actggtaac atcgggtgggt  
501 gggccttat gattgtctt ggcattcgca gggctatac ccgcggagg  
551 tcctcaacgc ggccatcatt tcttcgtccg cccggcccta cgaggagcag  
601 atgatggccg actggacccg ccgaacccctc ctggagctag tccctgctgt  
651 gcgtgtgccg gtacattca gcatcgccca acacgaaaag gtttggcage  
701 gcgatagttc agcgctagat gaaatcgccg tccgttctc tggcgcccg  
751 cggtcatcc tgcattgaaaca acccgaggcc ggacacaaca tcagcctggg  
801 ccacaccgcc ggcgactacc acacgacagt cctgtcggtt gtccagcaat  
851 gtctggccga acggttggcc aacgcgcaac aagatgtcga tctcgccggcc  
901 gagtga

**FIGURE 11**

## MlsA1 protein

VIFGDAHQNCRRGRVLGDAVAVVGMSCRVPGASDPDALWALLRDGI SVVDEIPSARWNLD GLVAHRLTDEQRSALRHGAFLLDDVEGFDAAFFGINPSEAGSMDPQQQLMELTWAALEDA RIVPEHLSGSSSGVFTGAMSDDYTTAVTYRAAMTAHTFAGTHRSLI ANRVSYTLGLRGPS LVIDTGQSSSLAVHVAMESLRREETS LAIAGGIHLNLSLAAALSAAHFGALSPDGRCYT FDARANGYVRGEGGGVVVLKRLNDALADGNHIYCVIRGSSVNNDGATQDLTAPGVGDQRO ALLQAYERAEIDPSEVQYVELHGTGTRLDPTEAHSLHSVFGTSTVPRSPLLVGSIKTNI GHLEGAAGILGLIKTALAVHHRQLPPSLNYTVPNPKIPL EQLGLRVQTTLSEWPDLKPL TAGVSSFSMGGTNAHLILQQLQPPPTDPTTQTPNPTTGS DPAVGSDPAVGVLVWPLSARSAPG LSAQAARLYQHLSAHPDLDPIDVAHSLATTRSHPHRATITTSIEHHSENNHDTDALAA LHALANGNTHPLLSRGLLTPQPGPKTVFVFPQGSQYPGMGADLYRQFPVFAHALDEVA AALNPHLDVALLEVMSQQDTAMAQLLDQTFYAQPALFALGTALHRLFTHAGIHPDYLLGH SIGELTAAYAAGVLSLQDAATLVTSGRQLMQSCTPGGTMLALQASEAEVQPLLEGGLDHAV SIAAINGATSIVLSGDHDSLEQIGEHFITQDRRTTRLQVSHAFHSPHMDPILEQFRQIAA QLTFSAPTL PILS NLTGQIARHDQLA SPDYWTQQLRNTVRFHDTVAALLGAGEQV FLELS PHPVLTQAITDTVEQAGGGGAAPALRKDRPDAVAFAAALGQLHCHGISPSWNVLYCQAR PLTLPTYAFQHQRWLLPTAGDFSGANTHAMHPLLDTATELAENRGWVFTGRIS PRTQPW LNEHAVESAVLFPNTGFVELALHVADRAYSSVNE LIVHTPLLAGHDTADLQITVTD TD DMGRQSLNIHSHPHIGHDNTTGDEQPEWVLHASAVLTAQTTDHNLPLTPVWPPP GT AIEVDDFYDDLAQGYNYGPTFQGVQRIWRDHATPDVIYA EVELPEDTDIDGYGIHPALF DAALHPLLALTQPPNTDNTADTGDQVRLPYAFTGISLHATHATRLRVRLTRGADA ITVHTSDTTGAPVAIIDSLITRPLTTATGSAPATTAAGLLHLSWPPHPDTTD TD DTD A LRYQVIAEPTQQLPRYLHDLHTSTDHTSTTEADVVVWVVPVPSNEELQAHQASDTAVSS RIHTLTRQTLTVVQDWLTHPDGTGLVIVTRHGVS TSAHD PVPDLAHA AVWGLIRSAQ N EHPGRFTL LD TDDNTNSDTLTTALTLPTRENQLAIRRTIHIPR LTRHSSDGALTAPVVV DPEGTVLITGGTGTGALFAEHLVSAHGVRLHLLTSRRGPQAHGATDLQQLTDLGAHVT ITACDISDPEA LAALVNSVPTQHRLTAVVHTAAVLADTPVTE LTGDQLDQVLA PKIDA A QLHOLTYEHNLSAFIMFSSMAGMIGSPGQGNYAAANTAL DALADYRHLGLPATS LA WGY WQTHGLTAHLDV DLA MTRLGLMPIATSHGLALFDAA LATGQPVSI PAPINTHTLARH ARDNTLAPILS ALITT PRRRAASAATD LAARLNGLSPQQQQT LATLVA AATATVLGHHT PESISPATAFKDLGIDSITA LERNLTHNTGLNLSSTI FHD PTHAVA EHLLEQIPGI GALVPAVVI AAGRTEEPVAVVGMACRFPGGVASADQLWDLVIA GRD VVGNFPADRGWDV EGLFD PDPDAVGKTYTRYGAFLDDAAGFDAGFFGISPREAR A MDPQQRLLLEV CWEALET AGIPAH TLAGTSTGVFVGAWAQSYGATNS DDAEGYAM TGGATSVMSGRIAYTLGLEGPAI TVDTACSSSLV A IHLACQSLRNNESQLALAGGVTVMSTPAVFTDFS RQGLAPDGRCKAF AATADGTGWGEAAVLVLERLSEARRNNHPV LAIVAGSA INQDGASNGLTAPH GPSQQRV INQALANAGLTHDQVDAVEAHGTTLGDPIEAGALHATYGHHTPDQPLWLGSIKSNIG HTQAAAGAAGVVKM IQAITHATLPATLHV DQPSPHIDWSSGTVRLLTEPIQWPNTDH PRT AAVSFGISGTNAHLILQQLQPPPTD TTQTPNPTTGS DPAVGSDSAVGSDPAVGVLVWPLSA RSAPGLSAQAARLYQHLSAHPDLDPIDVAHSLATTRSHPHRATITTSIEHHSENNHDT DALAALHALANGNTHPLLSRGLLTPQPGPKTVFVFPQGSQYPGMGADLYRQFPVFAHAL DEVA AALNPHLDVALLEVMSQQDTAMAQLLDQTFYAQPALFALGTALHRLFTHAGIHPD YLLGHSIGELTAAYAAGVLSLQDAATLVTSGRQLMQSCTPGGTMLALQASEAEVQPLLEG LDH A VSIAAINGATSIVLSGDHDSLEQIGEHFITQDRRTTRLQVSHAFHSPHMDPILEQF RQIAAQLTFSAPTL PILS NLTGQIARHDQLA SPDYWTQQLRNTVRFHDTVAALLGAGEQV FLELS PHPVLTQAITDTVEQAGGGGAAPALRKDRPDAVAFAAALGQLHCHGISPSWNVLYCQAR PLTLPTYAFQHQRWLLPTAGDFSGANTHAMHPLLDTATELAENRGWVFTGRIS PRTQPW LNEHAVESAVLFPNTGFVELALHVADRAYSSVNE LIVHTPLLAGHDTADLQITVTD TD DMGRQSLNIHSHPHIGHDNTTGDEQPEWVLHASAVLTAQTTDHNLPLTPVWPPP GT AIEVDDFYDDLAQGYNYGPTFQGVQRIWRDHATPDVIYA EVELPEDTDIDGYGIHPALF DAALHPLLALTQPPNTDNTADTGDQVRLPYAFTGISLHATHATRLRVRLTRGADA ITVHTSDTTGAPVAIIDSLITRPLTTATGSAPATTAAGLLHLSWPPHPDTTD TD DTD A LRYQVIAEPTQQLPRYLHDLHTSTDHTSTTEADVVVWVVPVPSNEELQAHQASDTAVSS RIHTLTRQTLTVVQDWLTHPDGTGLVIVTRHGVS TSAHD PVPDLAHA AVWGLIRSAQ N EHPGRFTL LD TDDNTNSDTLTTALTLPTRENQLAIRRTIHIPR LTRHSSDGALTAPVVV DPEGTVLITGGTGTGALFAEHLVSAHGVRLHLLTSRRGPQAHGATDLQQLTDL

FIGURE 12

**FIGURE 12(continued)**

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AMHPLLDTATELAENRGWVFTGRISPRTPWLNEHAVESAVLFPGTGFVELALHVADRG  
 YSSVNEIVHTPLLLAGHTADLQITVTDTDDMGRQSLNIHSRPHIGHDNTTGDEQPEW  
 VLHASAVLTAQTTDHNLPLTPVPPPGTAAIEVDDFYDDLAQGNYGPTFQGVQRIW  
 RDHATPDVIYAEVELPEDTDIDGYGIHPALFDAALHPLLALTQPPNTDDNTADTGDQ  
 VRLPYAFTGISLHATHATRLRVRLTRTGADAITVHTSDTGAPVAIIDSLITRPLTTATG  
 SAPATTAAGLLHLSWP PHPDTTDTDTDALRYRVIAEPTQQLPRYLHDLHTSDLHTS  
 TTEADVVVWPVPVPSNEELQAHQASDTAVSSRIHTLRTQTLTVVQDWLTHPDGTGRLVI  
 VTRHGVSHTSAHDPPVPLAHAAVWGLIRSAQNEHPGRFTLLDNTSDTLTTALTPTR  
 ENQLAIRRDTIHPRLTRHSSDGALTAPVVDPFGTVLITGGTGTGALFAEHLVSAHGV  
 RHLLTSRRGPQAHGATDLQQLTDLGAHVTITACDISPDEALALVNSVPTQHRLTAVV  
 HTAAVLADTPVTELTGDQLDQVLAPKIDAALWQLHQLTYEHNLSAFIMFSSMAGMIGSPGQ  
 GNYAAANTALDALADYRHRLGLPATS LAWGYWQHTGLTAHLDVDLARMTRLGLMPIAT  
 SHGLALFDAALATGQPVSIPAPINTHTLARHARDNTLAPILSALITPDRRAASAATDLA  
 ARLNGLSPQQQQTLATLVAATATVLGHHTPESISPATAFKDLGIDSLTAELRNTLTH  
 NTGLDLPPTLIFDHPTPTALTQHLHTRLTGALVPAPVVIAGRTEEPVAVGMACRFPG  
 GVASADQLWDLVIAGR DVVGNFPADRGWDVEGLFD PDPDAVGKTYTRYGAFLDDAAGFDA  
 GFFGISPREARAMDQQLLLEV CWEALETAGI PAHTLAGTSTGVFVGAWAQS YGATNSD  
 DAEGYAMTGGAI SVMSGRIAYT LGLEGP AITVDTACSSSLV A IHLACQSLRNNESQLALA  
 GGVTVMSTPAVFTDFSRQRGLAPDGRCKAFAATADGTGFGE GA AVL VLERLSEARRNNH  
 VLAIVAGSAINQDGASNGLTAPH GPSQQRV INQALANAGL THDQV DAVEAHGTGTTLGDP  
 IEAGALHATYGH HHTPDQPLWLGSIKS NIGHTQAAAGAAGVVKMIQAI THATLPATLHV  
 QPSPHIDWSSGTVRLLTEPIQWPNTDHPRTA AVSSFGISGTNAHLLIQLQPPPTPDTTQTPN  
 TTTGSDPAVGSDPAVGVLVWPLSARSAPGLSAQAARLYQHLSAHPDLDPI DVAHSLATTR  
 SHHPRATITTSIEHHSENNHDTTDALAALHALANGTHPLLSRGLLTPQGP GKT V FVFP  
 GQGSQYPMGADLYRQFPVFAHALDACDAALQPTGWSVLA VLHDEPEAPS LERV D VVQ P  
 VLF SVMVSLAALWRWAGITPD AVIGH SQGEIAAHVAGALTLPEAA VVALRSRVLTDLA  
 GAGAMASVLSPEEPLTQLLARWDGKITVAA VNGPASAVVSGDTTAI TELLITCEHENIDA  
 RAI PVDYPSHSPYMEHIRHQFLDEPELTPRSTI AMYSTVDGE PHTD TAYDTTM TADY  
 YRNIRNTVRFHDTVAALLGAGEQV FLELSHPVLTQAITDTVEQAGGGGAAVPA L R KDR P  
 DAVAFAA ALGQLHCHGIPSWNVLYCQARPLT LPTYAFQH QRYWLLPTAGDFSGANTH  
 HPLLDTATELAENRGWVFTGRISPRTPWLNEHAVESAVLFPGTGFVELALHVADRGYS  
 SVSNEIVHTPLLLAGHTADLQITVTDTDDMGRQSLNIHSRPHIGHDNTTGDEQPEWVL  
 HASAVLTAQTTDHNLPLTPVPPPGTAAIEVDDFYDDLAQGNYGPTFQGVQRIW  
 HATPDVIYAEVELPEDTDIDGYGIHPALFDAALHPLLALTQPPNTDDNTADTGDQVR  
 LPYAFTGISLHATHATRLRVRLTRTGADAITVHTSDTGAPVAIIDSLITRPLTTATGSA  
 PATTAAGLLHLSWP PHPDTTDTDTDALRYQVIAEPTQQLPRYLHDLHTSDLHTSTT  
 EADVVVWPVPVPSNEELQAHQASDTAVSSRIHTLRTQTLTVVQDWLTHPDGTGRLV  
 RHGVSTSAHDPPVPLAHAAVWGLIRSAQNEHPGRFTLLDNTSDTLTTALTPTR  
 QLAI RRD T IHPRLTRTAVLTPDGPWR LDTGKGD LANL ALLPTAHTALASQI R IDV  
 RAAGLNFDVVA VGLI PDDGFGGEAAGVISEIGPDVYGF AVGDAVTG M TVSGAFAPSTV  
 ADH RMVMTI PARWSFPQAA SIPV VFTAYIA LAEISGLSRGQRVLIHAGTGGVGMAAIQL  
 AHHLGAEVFATASA AKWSTLEALGVPRDHIASSRTLDF SNAFL DATNGAGV D VV L NCLSG  
 EFVEASLALLFRGGH FVEIGKTDIRDTEVIAATHPGVYI RAL DLLS VSPDHI QRT LAQLS  
 PLFATDTLKPPLPTTNSIYQAI SAI RDMSQARH TGKIVLTAPVVDP EGTVLITGGTGL  
 GALFAEHLVSAHGV R HLL L TSRRGPQAHGATDLQQLTDLGAHVTITACDISPDEA LAAL  
 VNSVPTQHRLTAVVHTAAVLADTPVTELTGDQLDQVLAPKIDAALWQLHQLTYEHNLSAFI  
 MFSSMAGMIGSPGQNYAAANTALDALADYRHRLGLPATS LAWGYWQHTGLTAHLDV  
 LARMTRLGLMPIATSHGLALFDAALATGQPVSIPAPINTHTLARHARDNTLAPILSALIT  
 TPDRRAASAATDLAARLNGLSPQQQQTLATLVAATATVLGHHTPESISPATAFKDLGI  
 DSLTAELRNTLHNTGLNLSSTLIFDHPTPHAVAEHLL EQI PGIGALV PAPVVI AAGRT  
 EEPVAVVGMACRFP GGVASADQLWDLVIAGR DVVGNFPADRGWDVEGLFD PDPDAVGKTY  
 TRYGAFLDDAAGFDAGFFG ISPREARAMDQQLLLEV CWEALETAGI PAHTLAGTSTGV  
 FVGAGAQSYGATNSDDAEGYAMTGGATVMSGRIAYT LGLEGP AITVDTACSSSLV A IHL  
 ACQSLRNNESQLALAGGVTVMSTPAVFTEF SRQRGLAPDGRCKAFAATADGTGFGEAAV  
 LVLERLSEARRNNH PVLAIVAGSAINQDGASNGLTAPH GPSQQRV INQALANAGL THDQV  
 DAVEAHGTGTTLGDPIEAGALHATYGH HHTPDQPLWLGSIKS NIGHTQAAAGAAGVVKMI  
 QAI THATLPATLHV DQPSPHIDWSSGTVRLLTEPIQWPNTDHPRTA AVSSFGISGTNAH

FIGURE 12(continued)

ILQQPPTPNPTQTPEDCSPAQS PCATITDAGTGLSFVPWVISAKSAEALSAQASRLLTRL  
 DDDPVVDAIDLGSLSIATRSMFHRVVGADRHLQRLAELASGNLGADVVG RARAA  
 GETVMVFPQGSQRLGMGAQLYEQFPVFAAAFFDV DALDQYLRPLRQVMWG DDEGLLN  
 STEFAQPSLFAVEVALFALLRFWGVPVDYVIGHSVGELAAAQAGVLSI QDAAKLVSARG  
 RLMQALPAGGAMVAVAASQHEVEPLLVEGV DIAALNAPGSVVISGDQAAVRLIANRLADR  
 GYRAHELAVSHAFHSSLMEPMLEEFARLASEIVVEQPQIPLISNV TQQLANADYGSAGY W  
 VDHIRR PVRFADSVASLEAMGASC FIEVGPA SGLGAAIEQSLKSAEPTVS SALSTD KPE  
 SVAVLRAAARLSTSGIPV DWQS VFDGRSTQTVNLPTYAFQRQRFWL DANRIGQGD P ASQP  
 QAQNVESRFWEAVEREDVDGLAD SIGVTASAMQTVLPALSSWRRAERTQSELD SWRYQVT  
 WLSSPATPSSITLSGIWLLIVPSELAKTD PVI GCAA ALEAH GALV TIIITI FEPDFNRSLM  
 GASLKDIGHISGVISFLGIHGSEFSDSGAVKTLNLQAMGDVHLDVPLWCLTQGAVSIS  
 ADDLIRCSSAALVWGLRVVALEHPGSWGLVLPESPDDAAW ERLCALLAQPTDEDQFA  
 IRPSGVFLRRLIHA PATTTSKSSTA WAPRGTVLITGGT GALGAHVARWLAHKY ESDV D LLL  
 TSRRGMAADGATELVDDLRTAGASVTVHACDVTDR TSVEAAIAGKS LDAV FHLAGRHQPT  
 LLTELEDESFSDELAPK VHG A QVLS DITSN LTL SA FVMFSSVAGI WGGKSQGAYAAANAF  
 LDSLA EKRRTLGLPAT SVAWGLWAGGGM GDRPSASGLN LIGLKSM SADLA VQAL SDAI DR  
 PQATLT VASVN WDRF YPTFALARPRPFLHEITEV MAYRESMRSSS ASTATLLT SKLAGLT  
 ATEQR ATRKL VLDQ AASV LGYASTESLDTHESFKD LGFDSLT ALELRDHLQ TATGLNLS  
 STLI FDHPTPH AVEHLL E QIPGIGALV PAPV VIAAGRTEEPVAVVGMACRFP GG VASAD  
 OLWDLVIA GRDV VGNF PADRG DVEGLFD PDPDAVGK TYTRYGAFLDDAAGFDAGFF G IS  
 PREAR AMDPQQRLLLEV CWEALETAGI PAHT LAGT STGV FAGAWA QSYGATNS DDAEGY A  
 MTGGSTSVMSGRIAYT LGLEGP AITVDTACSSSLV AHI LACQSLRNNE SQLA LAGG VTM  
 STPAI FTEFSQRGLAPDGRCKAFAA TADGTGFGE GA AVL VLERLSEARRNNHPVLA IV A  
 GSAINQDGASNGLTAPH GPSQ RVINQ ALANAGLTHDQ DAVEAH GTGTT LGDPIEASAL  
 HATYGHHTPDQPLWLGSIKS NIGHTQAAAGVVKM I QAI THATLPATLHV DQPS PHI  
 DWSSGT VRLLEPIQWPNTDHPRTAAVSSFGISGTNAH LILQQPPTPD T T QTPN T TGS D  
 PAVGSDPAVGVLVWPLSARSAPGLSAQ AARLYQHLSAHPDLD P IDVAHSLATRSHH P H R  
 ATITSIEHHSENNHDT DALA ALHALAN NGTHPLLSRG L LTPQGPGKTVFVFPQG QSY  
 PGMGADLYRQFPVFAHALD ACD AALQ PFTGWSV LAVLHD EPEAPS LERV D VVQ PVL F SVM  
 VSLA ALWRWAGITP DAVI GHSQGEIAAAHVAGALTLP EAA VVALRSRV L TDLAGAGAMA  
 SVLSPEEPLTQ LLA RWDG KITV AAVNGPAS AVVSGDT T A IELLITCEHENIDARAI PVD  
 YPSHSPYMEHIRH QFL D EPLPELTPRPSTI AMYSTVDGEPHDTAYDT TMTAD YWYRNIR N  
 TVRFHDTVA ALLGAGEQV FLE LSPHPVLTQ AITD TVEQAGGGAAVPA L R KDRP DAVAFA  
 AALGQLHCHG I SPSWNVLYCQARPLT P YAFQHQRYW LPTAGDFSGANTHAMHPLLD T  
 ATELAENRGWVFTGRIS PRTQ PWLNE HAVE SAVLFP GTGF VELAHVAD RAGYSSV NELI  
 VHTPLLLAGHDTADLQITVTD TDDMGRQSLNIHSHPHIGHDNTTGDEQPEWVLHASAVL  
 TAQTDHNHLPLTPVWPWPPGTTAAIEVDDFYDDLAQG YNYGPTFQGVQRIWRD HATPD V  
 IYAEV ELPEDTDIDGYGIH PALF D AALHPLLA T QPPTNDTDDNTADTGDQVRLPYAFT  
 GISLHATHATR LRVRLTRGADAI TVHTSDTTGAPV A I D S L I T R P L T T A T G S A P A T T A A  
 GLLHLSWPPHPDTT DTD T D A L R Y QVIAEPTQQLPRYLHDLH TSTTEADVVVWPVPVP  
 SNEELQAHQASDTAVSSRIHTLRTQTLTVQDWLTHPD T T GTRL VIVTRHGVSTSAHDP V  
 PDLAHA AVWGLI R S A Q N E H P G R F T I L D T D D N T N S D L T T A L T L P T R E N Q L A I R R D T I H I P  
 RLTRHSSDGAL TAPV VDPEGT V LITGGT GTL G A F E H L V S A H G V R H L L L T S R R G P Q A H  
 GATDLQQR L T D L G A H V T I T A C D I S D P E A L A A L V N S V P T Q H R L T A V V H T A A V L A D T P V T E L  
 TGDQDQVLAPKIDAAWQLHQLTYEHNL S AFIM FSSMAGMIGSPGQG NYAA A N T A L D A L A  
 DYRHRLGLPATS LA WGYWQ THTGLTAH L TDV D L A R M T R L G L M P I A T S H G L A L F D A A L A T G  
 QPVSI PAPINTHTLARHARDN T L A P I L S A L I T P R R A A S A A T D L A A R L N G L S P Q Q Q Q Q T  
 LATI VAAATATV LGHHTPESI SPATAFKDLGIDS LTALELRNLT HNTG L D L P P T L I F D H  
 PTPHAVA E HLL E Q I P G I G A L V P A P V V I A A G R T E E P V A V V G M A C R F P G G V A S A D Q L W D L V I  
 AGRDV VGNF PADRG DVEGLFD PDPDAVGK TYTRYGAFLDDAAGFDAGFF G IS PREAR A M  
 DPQQRLLLEV CWEALETAGI PAHT LAGT STGV FAGAWA QSYGATNS DDAEGY A M TGG S T S  
 VMSGRIAYT LGLEGP AITVDTACSSSLV AHI LACQSLRNNE SQLA LAGG VTM S T P A V F T  
 EFSRQ RGLAPDGRCKAFAA TADGTGFGE GA AVL VLERLSEARRNNHPVLA IV A G S A I N Q D  
 GASNGLTAPH GPSQ RVINQ ALANAGLTHDQ DAVEAH GTGTT LGDPIEASAL HATYGH H  
 HTPDQPLWLGSIKS NIGHTQAAAGVVKM I QAI THATLPATLHV DQPS PHI D WSSGT V  
 RLLTEPIQWPNTDHPRTAAVSSFGISGTNAH LILQQPPTPD T T QTPN T TGS D P A V G S D P  
 AVGV LVWPLSARSAPGLSAQ AARLYQHLSAHPDLD P IDVAHSLATRSHH P H R A T I T T S I

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EHHSENNHD T D A A L H A L A N N G T H P L L S R G L L T P Q G P G K T V F V F P G Q G S Q Y P G M G A D L  
 Y R Q F P V F A H A L D A C D A A L Q P F T G W S V L A V L H D E P E A P S L E R V D V V Q P V L F S V M V S L A A L W  
 R W A G I T P D A V I G H S Q G E I A A A H V A G A L T L P E A A A V V A L R S R V L T D L A G A G A M A S V L S P E E  
 P L T Q L L A R W D G K I T V A A V N G P A S A V V S G D T T A I T E L L I T C E H E N I D A R A I P V D Y P S H S P Y  
 M E H I R H Q F L D E L P E L T P R P S T I A M Y S T V D G E P H D T A Y D T T M T A D Y W Y R N I R N T V R F H D T  
 V A A L L G A G E Q V F L E L S P H P V L T Q A I T D T V E Q A G G G G A A V P A L R K D R P D A V A F A A A L G Q L H  
 C H G I S P S W N V L Y C Q A R P L T L P T Y A F Q H Q R Y W L L P T A G D F S G A N T H A M H P L L D T A T E L A E N  
 R G W F T G R I S P R T Q P W L N E H A V E S A V L F P G T G F V E L A L H V A D R A G Y S S V N E L I V H T P L L L  
 A G H D T A D L Q I T V T D T D D M G R Q S L N I H S R P H I G H D N T T G D E Q P E W V L H A S A V L T A Q T T D H  
 N H L P L T P V P W P P P G T A A I E V D D F Y D D L A A Q G Y N Y G P T F Q G V Q R I W R D H A T P D V I Y A E V E L  
 P E D T D I D G Y G I H P A L F D A A L H P L L A L T Q P P T N D T D D T N T A D T G D Q V R L P Y A F T G I S L H A T  
 H A T R L R V R L T R T G A D A I T V H T S D T T G A P V A I I D S L I T R P L T T A T G S A P A T T A A G L L H L S W  
 P P H P D T T T D T D T D A L R Y Q V I A E P T Q Q L P R Y L H D L H T S T D L H T S T T E A D V V V W P V P V P S  
 N E E L Q A H Q A S D T A V S S R I H T L R Q T L T V V Q D W L T H P D T G T R L V I V T R H G V S T S A H D P V P  
 D L A H A A V W G L I R S A Q N E H P G R F T L L D T D D N T N S D T L T A L T L P T R E N Q L A I R R D T I H I P R  
 L T R T A V L T P P D S G P W R L D T T G K G D I L A N L A L L P T A H T A L A S G Q I R I D V R A A G L N F H D V V V A  
 L G L I P D D G F G G E A A G V I S E I G P D V Y G F A V G D A V T G M T V S G A F A P S T V A D H R M V M T I P A R W  
 S F P Q A A S I P V V F L T A Y I A L A E I S G L S R G Q R V L I H A G T G G V G M A I Q L A H H L G A E V F A T A S  
 A A K W S T L E A L G V P R D H I A S S R T L D F S N A F L D A T N G A G V D V V L N C L S G E F V E A S L A L L P R G  
 G H F V E I G K T D I R D T E V I A A T H P G V I Y R A L D L L S V S P D H I Q R T L A Q L S P L F A T D T L K P L P T  
 T N Y S I Y Q A I S A L R D M S Q A R H T G K I V L T A P V V V D P E G T V L I T G G T G T L G A L F A E H L V S A H G  
 V R H L L L T S R R G P Q A H G A T D L Q Q R L T D L G A H V T I T A C D I S D P E A L A V N S V P T Q H R L T A V  
 V H T A A V L A D T P V T E L T G Q L D Q V L A P K I D A A W Q L H Q L T Y E H N L S A F I M F S S M A G M I G S P G  
 Q G N Y A A N T A L D A L A D Y R H R L G L P A T S L A W G Y W Q T R T G V T A H L T D V D L A R M T R L G L M P I A  
 T S H G L A L F D A A L A T G Q P V S I P A P I N T H T L A R H A R D N T L T P I L S A L I T T P R R R A A S A A T D L  
 A A R L N G L S P Q Q Q Q Q T L A T L V A A A T A V L G H H T P E S I S P A T A F K D L G I D S L T A L E L R N T L T  
 H N T G L D L P P T L I F D H P T P T A L T Q H L H T R L T G A L V P A P V I A A G R T E E P V A V V G M A C R F P  
 G G V A S A D Q L W D L V I A G R D V V G N F P A D R G W D V A G L F D P D D A V G K T Y T R Y G A F L D D A A G F D  
 A G F F G I S P R E A R A M D P Q Q R L L L E V C W E A L E T A G I P A H T L A G T S T G V F V G A G A Q S Y G A T N S  
 D D A E G Y A M T G G A I S V M S G R I A Y T L G L E G P A I T V D T A C S S L V A I H L A C Q S L R N N S Q L A L  
 A G G V T V M S T P A V F T D F S R Q R G L A P D G R C K A F A A T A D G T G F G E G A A V L V L E R L S E A R R N N H  
 P V L A I V A G S A I N Q D G A S N G L T A P H G P S Q Q R V I N Q A L A N A G L T H D Q V D A V E A H G T G T L G D  
 P I E A G A L H A T Y G H H H T P D Q P L W L G S I K S N I G H T Q A A A G A G V V K M I Q A I T H A T L P A T L H V  
 D Q P S P H I D W S S G T V R L L T E P I Q W P N T D H P R T A A V S S F G I S G T N A H L L I L Q Q P P T P D T T Q T P  
 N P T T G S D P A V G S D S A V G S D P A V G V L V W P L S A R S A P G L S A Q A R L Y Q H L S A H P D L D P I D V A  
 H S L A T T R S H H P H R A T I T T S I E H S E N N H D T T D A A L H A L A N N G T H P L L S R G L L T P Q G P G  
 K T V F V P G Q G S Q Y P G M G A D L Y R Q F P V F A H A L D E V A A A L N P H L D V A L L E V M F S Q Q D T A M A Q  
 L L D Q T F Y A Q P A L F A L G T A L H R L F T H A G I H P D Y L L G H S I G E L T A A Y A A G V L S I L Q D A A T L V T  
 S R G R L M Q S C T P G G T M L A L Q A S E A E V Q P L L E G L D H A V S S I A A I N G A T S I V L S G D H D S L E Q I G  
 E H F I T Q D R R T T R L Q V S H A F H S P H M D P I L E Q F R Q I A A Q L T F S A P T L P I L S N L T G Q I A R H D Q  
 L A S P D Y W T Q Q L R N T V R F H D T V A A L L G A G E Q V F L E L S P H P V L T Q A I T D T V E Q A G G G G A A V P  
 A L R K D R P D A V A F A A A L G Q L H C H G I S P S W N V L Y C Q A R P L T L P T Y A F Q H Q R Y W L L P T A G D F S  
 G A N T H A M H P L L D T A T E L A E N R G W F T G R I S P R T Q P W L N E H A V E S A V L F P N T G F V E L A L H V  
 A D R A G Y S S V N E L I V H T P L L A G H D T A D L Q I T V T D T D D M G R Q S L N I H S R P H I G H D N T T G D  
 E Q P E W V L H A S A V L T A Q T D H N H L P L T P V P W P P P G T A A I E V D D F Y D D L A A Q G Y N Y G P T F Q G  
 V Q R I W R D H A T P D V I Y A E V E L P E D T D I D G Y G I H P A L F D A A L H P L L A L T Q P P T N D T D D T N T A  
 D T G D Q V R L P Y A F T G I S L H A T H A T R L R V R L T R T G A D A I T V H T S D T T G A P V A I I D S L I T R P L  
 T T A T G S A P A T T A A G L L H L S W P P H P D T T D T D T D T D A L R Y Q V I A E P T Q Q L P R Y L H D L H T  
 S T D L H T S T T E A D V V V W P V P V S N E E L O Q A H Q A S D T A V S S R I H T L R Q T L T V V Q D W L T H P D T  
 T G T R L V I V T R H G V S T S A H D P V P D L A H A A V W G L I R S A Q N E H P G R F T L L D T D D N T N S D T L T T  
 A L T L P T R E N Q L A I R R D T I H I P R L T R H S S D G A L T A P V V V D P E G T V L I T G G T G T L G A L F A E H  
 L V S A H G V R H L L L T S R R G P Q A H G A T D L Q Q R L T D L G A H V T I T A C D I S D P E A L A V N S V P T O  
 H R L T A V V H T A A V L A D T P V T E L T G D Q L D Q V L A P K I D A A W Q L H Q L T Y E H N L S A F I M F S S M A G  
 M I G S P G Q Q N Y A A N T A L D A L A D Y R H R L G L P A T S L A W G Y W Q T H G L T A H L T D V D L A R M T R L  
 G L M P I A T S H G L A L F D A A L A T G Q P V S I P A P I N T H T L A R H A R D N T L A P I L S A L I T T P R R R A A  
 S A A T D L A A R L N G L S P Q Q Q Q Q T L A T L V A A A T A V L G H H T P E S I S P A T A F K D L G I D S L T A L E  
 L R N T L T H N T G L D L P P T L I F D H P T P T A L T Q H L H T R L T Q I E S P N S E D S M L N L K N L D R I E S Y I  
 F R N S G E D R A H V I A N R L R S I L S K W D G T R S P E L P A E L H L E S A T D D E L F S L A N M F R T P T S E I S  
 P T L E G G R G V N \*

FIGURE 12(continued)

## MlsA2 protein

VVSTEENLRVYLKQVITDLHQMQARLRKIEKQSERVAVVGMACRFPGGVASADOLWDLV  
 IAGRDPVGNFPADRGWDVEGLFDPPDAVGKYTRYGAFLDDAAGFDAGFFGSPREARA  
 MDPQRLLLEVCWEALETAGI PAHTLAGTSTGVFVGAWAQSYGATNSDGAEGYAMTGGST  
 SVMMSGRIAYTLGLLEGPAITVDTACSSLVAIHLACQSLRNNESQLALAGGVTVMSTPAVF  
 TEFSRQRGLAPDGRCKAFAATADGTGWGEAAVLVLERLSEARRNNHPVLAIVAGSAINQ  
 DGASNGLTAPHGPSQQRVINQALANAGLTHDQVDAVEAHGTGTLGDPIEASALHATYGH  
 HHTPDQPLWLGSIKSNIGHTQAAAGAAGVVVKMIAITHATLPATLHVDQPSPHIDWSSGT  
 VRLLEPIQWPNTDHPRTAAVSSFGISGNTNAHLILQQPPTPDTTQTPNTTGSDPAVGSD  
 SAVGSDPAVGVLVWPLSARSAPGLSAQAAARLYQHLSAHPDLDPIDVAHSLATTRSHHPR  
 ATITTSIEHHSENNHDTTDALAALHALANNGTHPLLSRGLLTPQGPGKTVFVPGQGSQY  
 PGMGADLYRQFPVFAHALDEVAAAALNPHLDVALLEVMSFSQQDTAMAQLLDQTFYAQPALF  
 ALGTLALHRLFTHAGIHPDYLGHSIGELTAAYAAGVLSIQDAATLVTSGRGLMQSCTPGG  
 TMLALQASEAEVQPLLEGLDHAVSIAAINGATSIVLSDGDHDSLEQIGEHFITQDRRTTRL  
 QVSHAFHSPHMDPILEQFRQIAAQLTFSAPTL PILS NLTGQIARHDQLASPDYWTQQLRN  
 TVRFHDTVAALLGAGEQVFLLESPHPVLTQAITDTVEQAGGGAAVPALRKDRPDAVAF  
 AALGQLHCHGTPSWSNVLYCQARPLTLPTYAFQHQRYWLLPTAGDFSGANTHAMHPLLDT  
 ATELAENRGWVFTGRISPRTPQWLNEHAVESAVLFPGTGFVELALHVADRAYSSVNE  
 VHTPLLLAGHDTADLQITVTDTDDMGRQSLNIHSHPHIGHDNTTGDEQPEWLHASAVL  
 TAQTDHNHLPLTPVWPWPPGTAAIEVDDFYDDLAAQGYNNGPTFQGVQRIWRDHA  
 TPDV IYAEVLPEDTDIDGYGIHPALFDAALHPLLALTQOPPTNDTDDNTADTGQVRLPYAFT  
 GISLHATHATRLRVRLTRTGADAITVHTSDTTGAPVAIIDSLITREPLTTATGSAPATTAA  
 GLLHLSWPPHPDTTDTDTDALRYQVIAEPTQQLPRYLHDLHTSTDHTSTTEADVV  
 WPVWPVPSNEELQAHQASDTAVSSRIHTLRTQTLTVVQDWLTHPDTTGTRLVIVTRHG  
 VST SAHDPVPDLAHAAVWGLIRSAQNEHPGRFTLLDTDDNTNSDTLTTALTLP  
 TRENQLAIRR DTIHIPRLTRAVLTPDGPWRLDTTGKGDILANLALLPTAHTALAS  
 QIRIDVRAAGLN FHDVVVALGLIPDDGFGGEAGVISEIGPDVYGFAVGDAV  
 TGMTVSGAFAPSTVADHRMV MTIPARWSFPQAASIPVVFATYIALAEISGLSR  
 GQRLVLIHAGTGGVGMAAIQLAHLGA EVFATASA  
 AKWSTLEALGVPRDHIASSRTLDFSN  
 AFDATNGAGV  
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FIGURE 13

### MslB protein

VI FGD AHN CRGG RV LG D A V A V V G M S C R V P G A S D P D A L W A L L R D G I S V V D E I P S A R W N L D G L V A H R L T D E Q R S A L R H G A F L D D V E G F D A A F F G I N P S E A G S M D P Q Q R L M L E L T W A A L E D A R I V P E H L S G S S S G V F T G A M S D D Y T T A V T Y R A A M T A H T F A G T H R S L I A N R V S Y T L G L R G P S L V I D T G Q S S S L V A V H V A M E S L R R E E T S L A I A G G I H L N L S L A A L S A A H F G A L S P D G R C Y T F D A R A N G Y V R G E G G G V V V L K R L N D A L A D G N H I Y C V I R G S S V N N D G A T Q D L T A P G V D Q R Q A L L Q A Y E R A E I D P S E V Q Y V E L H G T G T R L G D P T E A H S L H S V F G T S T V P R S P L L V G S I K T N I G H L E G A A G I L G L I K T A L A V H R Q L P P S L N Y T V P N P K I P L E Q L G L R V Q T T L S E W P D L D K P L T A G V S S F S M G G T N A H L L I L Q Q P P T P D T T Q T P N P T T G S D P A V G S D P A V G V L V W P L S A R S A P G L S A Q A R L Y Q H L S A H P D L D P I D V A H S L A T T R S H H P H R A T I T S I E H S E N N H D T T D A L A A L H A L A N G T H P L L S R G L L T P Q G P G K T V F V F P G Q G S Q Y P G M G A D L Y R Q F P V F A H A L D E V A A A L N P H L D V A L L E V M F S Q Q D T A M A Q L L D Q T F Y A Q P A L F A L G T A L H R L F T H A G I H P D Y L L G H S I G E L T A A Y A A G V L S L Q D A A T L V T S R G R I L M Q S C T P G G T M L A L Q A S E A E V Q P L L E G L D H A V S I A A I N G T A S I V L S G D H D S L E Q I G E H F I T Q D R R T T R L Q V S H A F H S P H M D P I L E Q F R Q I A A Q L T F S A P T L P I L S N L T G Q I A R H D Q L A S P D Y W T Q Q L R N T V R F H D T V A A L L G A G E Q V F L E L S P H P V L T Q A I T D T V E Q A G G G G A A V P A L R K D R P D A V A F A A A L G Q L H C H G I S P S W N V L Y C Q A R P L T L P T Y A F Q H Q R Y W L L P T A G D F S G A N T H A M P L L D T A T E L A E N R G W V F T G R I S P R Q P W L N E H A V E S A V L F P N T G F V E L A L H V A D R A G Y S S V N E L I V H T P L L L A G H D T A D L Q I T V T D T D D M G R Q S L N I H S H P H I G H D N T T G D E Q P E W V L H A S A V L T A Q T D H N H L P L T P V P W P P P G T A A I E V D D F Y D D L A A Q G Q Y N G P T F Q G V Q R I I W R D H A T P D V I Y A E V E L P E D T D I D G Y G I H P A L F D A A L H P L L A L T Q P P T N D D T N T A D T G D Q V R L P Y A F T G I S L H A T H A T R L R V R L T R T G A D A I T V H T S D T T G A P V A I I D S L I T R P L T T A G S A P A T T A A G L L H L S W P P H P D T T D T D T D A D L R Y Q V I A E P T Q Q L P R Y L H D L H T S D L H T S T E A D V V V W P V P V P S N E E L Q A H Q A S D T A V S S R I H T L T R Q T L T V V Q D W L T H P D T T G T R L V I V T R H G V S T S A H D P V P D L A H A A V W G L I R S A Q N E H P G R F T L L D T D D N T N S D T L T T A L T L P T R E N Q L A I R R D T I H I P R L T R H S S D G A L T A P V V V D P E G T V L I T G G T G T L G A L F A E H L V S A H G V R H L L L T S R R G P Q A H G A T D L Q Q R L T D L G A H V T I T A C D I S D P E A L A A L V N S V P T Q H R L T A V V H T A A V L A D T P V T E L T G D Q L D Q V L A P K I D A A W Q L H Q L T Y E H N L S A F I M F S S M A G M I G S P G Q G N Y A A A N T A L D A L A D Y R H R L G L P A T S L A W G Y W Q T H T G L T A H L T D V D L A R M T R L G L M P I A T S H G L A L F D A A L A T G Q P V S I P A P I N T H T L A R H A R D N T L A P I L S A L I T T P R R R A A S A A T D L A A R L N G L S P Q Q Q Q Q T L A T L V A A A T A T V L G H H T P E S I S P A T A F K D L G I D S L T A L E L R N T L H N T G L N L S S T L I F D H P T P H A V A E H L L E Q I P G I G A L V P A P V V I A A G R T E E P V A V V G M A C R F P G G V A S A D Q L W D L V I A G R D V V G N F P A D R G W D V E G L F D P D P D A V G K T Y T R Y G A F L D D A A G F D A G F F G I S P R E A R A M D P Q Q R L L L E V C W E A L E T A G I P A H T L A G T S T G V F V G A W A Q S Y G A T N S D D A E G Y A M T G G A T S V M S G R I A Y T L G L E G P A I T V D T A C S S S L V A I H L A C Q S L R N N E S Q L A L A G G V T V M S T P A V F T E F S R Q R G L A P D G R C K A F A A T A D G T G W G E G A A V L V L E R L S E A R R N N H P V L A I V A G S A I N Q D G A S N G L T A P H G P S Q Q R V I N Q A L A N A G L T H D Q V D A V E A H G T G T L G D P I E A S A L H A T Y G H H H T P D Q P L W L G S I K S N I G H T Q A A A G V V K M I Q A I T H A T L P A T L H V D Q P S H I D W S S G T V R L L T E P I Q W P N T D H P R T A A V S S F G I S G T N A H L I L Q Q P P T P N P T Q T P E D C S P A Q S P C A T I T D A G T G L S F V P W V I S A K S A E A L S A Q A S R L L T R L D D D P V V D A I D L G W S L I A T R S M F E H R A V V V G A D R H Q L Q R G L A E L A S G N L G A D V V V G R A R A A G E T V M V F P G Q G S Q R L G M G A Q L Y E Q F P V F A A A F D D V V D A L D Q Y L R L P L R Q V M W G D D E G L L N S T E F A Q P S L F A V E V A L F A L L R F W G V V P D Y V I G H S V G E L A A A Q V A G V L S L Q D A A K L V S A R G R I L M Q A L P A G G A M V A V A A S Q H E V E P L L V E G V D I A N A P G S V V I S G D Q A A V R L I A N R L A D R G Y R A H E L A V S H A F H S S I M E P M L E E F A R L A S E I V V E Q P Q I P L I S N V T G Q L A N A D Y G S A G Y W V D H I R R P V R F A D S V A S L E A M G A S C F I E V G P A S G L G A A I E Q S L K S A E P T V S V A L S T D K P E S V A V L R A A R L S T S G I P V D W Q S V F D G R S T Q T V N L P T Y A F Q R Q R F W L D A N R I G Q G D P A S Q P Q A Q N V E S R F W E A V E R E D V D G L A D S I G V T A S A M Q T V L P A L S S W R R A E R T Q S E L D S W R Y Q V T W L S S P A T P S S I T L S G I W L L I V P S E L A K T D P V I G C A A A L E A H G A L V T I I T I F E P D F N R S L M G A S L K D I G S H I S G V I S F L G I H G S E F S D S G A V K T L N L V Q A M G D V H L D V P L W C L T Q G A V S I S A D D L I R C S S A A L V W G L G R V V A L E H P G S W G G L V D L P E S P D D A A W E R L C A L L A Q P T D E D Q F A I R P S G V F L R R L I H A P A T T S K S S T A W A P R G T V L I T G G T G A L G A H V A R W L A H K Y E S V D L L L T S R R G M A A D G A T E L V D D L R T A G A S V T V H A C D V T D R T S V E A A I A G K S L D A V F H L A G R H Q P T L L T E L E D E S F S D E L A P K V H G A Q V L S D I T S N L T L S A F V M F S S V A G I W G G K S Q G A Y A A A N A F L D S L A E K R R T L G L P A T S V A W G L W A G G G M G D R P S A S G L N L I G L K S M S A D L A V Q A L S D A I D R P Q A T L T V A S V N W D R F Y P T F A L A R P R P F L H E I T E V M A Y R E S M R S S S A S T A T L L T S K L A G L T A T E Q R A V T R K L V L D Q A A S V L G Y A S T E S L D T H E S F K D L G F D S L T A L

**FIGURE 14**

ELRDHLQTATGLNLSSTLIFDHPTPHAVAEEHLLQEIPGIGALVPAPVVIAGRTEEPVAV  
 VGMACRFPGGVASADQLWDLVIAGRDVDGNFPADRGWDVEGLFDPDPDAVGKTYTRYGAF  
 LDDAAGFDAGFFGISPAREARMDPQQRLLEVCEALETAGIPAHTLAGTSTGVFVGAWA  
 QSYGATNSDDAEGYAMTGGATVMSGRIAYTLGLEGPATVDTACSSLVAIHLACQSLR  
 NNESQLALAGGVTVMSTPAVFTEFSRQRGLAPDGRCKAFAATADGTGWGEAAVLVLERL  
 SEARRNNHPVLAIVAGSAINQDGASNGLTAPHGPSQQRVINQALANAGLTHQVDAVEAH  
 GTGTLGDPIEASALHATYGHHTPDQPLWLGSIKSIGHTQAAAGAAGVVKMIAITHA  
 TLPATLHVDQPSPHIDWSSGTVRLLTEPIQWPNTDHPRTAAVSSFGISGTNAHLILQQPP  
 TPNPTQTPEDCSPAQSICATITDAGTGLSFVPWVIASAKSAAEALSAQASRLLTRLDDDPVV  
 DAIDLGWSLIATRSMFEHRAVVGADRHQQLQRLAELASGNLGADVVVGRARAAGETVMV  
 FPGQGSQRLGMGAQLYEQFPVFAAAFFDVVDALDQYLRPLRQVMWDGDEGLNSTEFAQ  
 PSLFAVEVALFALLRFWGVVPDYVIGHSGVGELEAAQVAGVLSLQDAAKLVSARGRLMQL  
 PAGGAMVAVAASQHEVEPLLVEGVEDIAALNAPGSVVIISGDQAAVRLIANRLADRGYRAHE  
 LAVSHAFHSSLMEPMLEEFARLASEIVVEQPQIPLISNVTGQLANADYGSAGYWDHIRR  
 PVRFADSVASLEAMGASCIEVGPASGLGAAIEQSLKSAEPTVSALSTDKPESVAVLR  
 AAARLSTSGIPVDWQSVFDGRSTQTVNLPTYAFQRQRFWLDANRIGQDPASQPQANVE  
 SRFWEAVEREDVDGLADSIGVTASAMQTVLPALSSWRAERTQSELDWSRYQVTWLSSPA  
 TPSSITLSGIWILLIVPSELAKTDVIGCAAALAEAHGALVITIITIFEPDFNRSLMGASLKD  
 IGSISGVISFLGIHGSEFSDGAVKTLNLVQAMGDVHLDVPLWCLTQGAVSISADDLIR  
 CSSAALVWGLGRVVALEHPGSWGLVLPESPDAAWERLCALLAQPTDEDQFAIRPSGV  
 FLRRLIHAPATTSKSSTAWAPRTVLIITGGTGAHVARWLHAKYESVDLLTSRRGM  
 AADGATELVDDLRTAGASVTVHACDVTDRTSVEAAIAGKSLDAVFHLAGRHQPTLLTELE  
 DESFSDELAPKVHGAQVLSDITSNLTLASFVFMSSVAGIWGGSQGAYAAANAFLDLAE  
 KRRTGLPATSVAWGLWAGGGMGRPSASGLNLIGLKSMSADLAVQALSDAIDRPQATLT  
 VASVNWDRFYPTFALARPRPFLHEITEVMAYRESMRSSSASTATLLTSKLAGLTATEQRA  
 VTRKLVLDQAAASVLYASTESLDTHESFKDLGFDSTALELRDHQLTATGLNLSSTLIFD  
 HPTPHAVAEEHLLQEIPGIGALVPAPVVIAGRTEEPVAVVGMACRFPGGVASADQLWDLV  
 IAGRDVDGNFPADRGWDVEGLFDPDPDAVGKTYTRYGAFLDDAAGFDAGFFGISPAREA  
 MDPQQLLLEVCEALETAGIPAHTLAGTSTGVFVGAWAQSYGATNSDDAEGYAMTGGAI  
 SVMGRIAYTLGLEGPATVDTACSSLVAIHLACOSLRNNESQLALTGGVTVMSTPAIF  
 TEFSRQRGLAPDGRCKAFAATADGTGWGEAAVLVLERLSEARRNNHPVLAIVAGSAINQ  
 DGASNGLTAPHGPSQQRVINQALANAGLTHQVDAVEAHGTGTLGDPIEASALHATYGH  
 HHTPDQPLWLGSIKSIGHTQAAAGAAGVVKMIAITHATLPATLHVDQPSPHIDWSSGT  
 VRLLTEPIQWPNTDHPRTAAVSSFGISGTNAHLILQQPPTDTTQTPNTTGSDPAVGSD  
 PAVGVLVWPLSARSAPGLSAQAARLYQHLSAHPDLDPIDVAHSLATTRSHHPRATITTS  
 IEHHSENNHDTTDALAALHALANNGTHPLLSRGLLTQPGPGKTVFVFPQGQSOYPMGAD  
 LYRQFPVFAHALDACDAALQPTFTGSVLAVLHDEPEAPSLERDVWVQPVLSVMVSLAAL  
 WRWAGITPAVIGHSQGEIAAAHVAGALTLPPEAAVVALRSRVLTDLAGAGAMASVLSPE  
 EPLTQLLARWDGKITVAAVNGPASAVVSGDTTAITELLITCEHENIDARAIPVDYPSHSP  
 YMEHIRHQFLDELPELTPRPSITIAMYSTVDGEPHDTAYDTTMADYWYRNIRNTVRFHD  
 TVAALLGAGEQVFLSPHPVLTQAITDTVEQAGGGGAAPVPLRKDRPDAVAFAAALGQL  
 HCHGISPSWNVLYCQARPLTLPTYAFQHQRYWLLPTAGDFSGANTHAMHPLLDTATELAE  
 NRGWVFTGRISPRTPQWLNEHAVESAVLFPGTGFVELALHVADRAYSSVNELIVHTPLL  
 LAGHDTADLQITVTDTDDMGRQSLNIHSRPHIGHDNTTGDEQPEWVLHASAVLTAQTD  
 HNHLPLTPWPWPPGTAAIEVDDFYDDLAAQGYNYGPTFQGVQRIWRDHATPDVIYAEVE  
 LPEDTDIDGYGIHPALFDAAHLPLLALTQPPNTDDNTNTADTGDQVRLPYAFTGISLHA  
 THATRLRVRLTRTGADAITVHTSDTTGAPVAIIDSLITRPLTTATGSAPATTAAGLLHLS  
 WPPHPDTTDTDTDALRYQVIAEPTQQLPRYLHDLHTSTDHTSTTEADVVVWPVPP  
 SNEELQAHQASDTAVSSRIHTLRTQTLTVQDWLTHPDTGTRLIVTRHGVSSTAHDPV  
 PDLAHAAVWGLIRSAQNEHGRFTLTDNTNSDNTLTTALTLPTRENQLAIRRDTIHIP  
 RLTRHSSDGALTAPVVDPGTBLITGGTGTGALFAEHLVSAHGVRLHLLTSRRGPOAH  
 GATDQLQQLTDLGAVTITACDISDPEALAAVNSVPTQHRLTAVVHTAAVLADTPVTEL  
 TGDQDQVLAPKIDAALWQHQLTYEHNLSAFIMFSSMAGMIGSPGQGNYAAANTALDALA  
 DYRHRLGLPATS LAWGYWQTHGTLTAHLDVDLARMTRGLMPIATSHGLALFDAALATG  
 QPVSIAPINTHTLARHARDNTLAPILSALITTPRRRAASAATDLAARLNGLSPQQQQQT  
 LATI VAAATATVLGHHTPESISPATAFKDLGIDS LTALELRNTLHNTGLDLPPTLIFDH  
 PTPHAVAEEHLLQEIPGIGALVPAPVVIAGRTEEPVAVVGMACRFPGGVASADQLWDLV

FIGURE 14(continued)

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AGR D V V G N F P A D R G W D V E G L F D P D P A V G K T Y T R Y G A F L D D A A G F D A G F F G I S P R E A R A M  
 D P Q Q R L L E V C W E A L E T A G I P A H T L A G T S T G V F A G A W A Q S Y G A T N S D D A E G Y A M T G G S T S  
 V M S G R I A Y T L G L E G P A I T V D T A C S S L V A I H L A C Q S L R N N E S Q L A L A G G V T V M S T P A V F T  
 E F S R Q R G L A P D G R C K A F A A T A D G T G F G E G A A V L V L E R L S E A R R N N H P V L A I V A G S A I N Q D  
 G A S N G L T A P H G P S Q Q R V I N Q A L A N A G L T H D Q V D A V E A H G T G T L G D P I E A S A L H A T Y G H H  
 H T P D Q P L W L G S I K S N I G H T Q A A A G A A G V V K M I Q A I T H A T L P A T L H V D Q P S P H I D W S S G T V  
 R L L T E P I Q W P N T D H P R T A A V S S F G I S G T N A H L I L Q Q P P T P D T T Q T P N P T T G S D P A V G S D P  
 A V G V L V W P L S A R S A P G L S A Q A A R L Y Q H L S A H P D L D P I D V A H S L A T T R S H H P H R A T I T T S I  
 E H H S E N N H D T T D A L A A L H A L A N N G T H P L L S R G L L T P Q G P G K T V F V F P G Q G S Q Y P G M G A D L  
 Y R Q F P V F A H A L D E V A A A L N P H L D V A L L E V M F S Q Q D T A M A Q L L D Q T F Y A Q P A L F A L G T A L H  
 R L F T H A G I H P D Y L L G H S I G E L T A A Y A A G V L S I L Q D A T L V T S R G R L M Q S C T P G G T M L A L Q A  
 S E A E V Q P L L E G L D H A V S I A A I N G A T S I V L S G D H D S L E Q I G E H F I T Q D R R T T R L Q V S H A F H  
 S P H M D P I L E Q F R Q I A A Q L T F S A P T L P I L S N L T G Q I A R H D Q L A S P D Y W T Q Q L R N T V R F H D T  
 V A A L L G A G E Q V F L E L S P H P V L T Q A I T D T V E Q A G G G G A A V P A L R K D R P D A V A F A A A L G Q L H  
 C H G I S P S W N V L Y C Q A R P L T L P T Y A F Q H Q R Y W L L P T A G D F S G A N T H A M H P L L D T A T E L A E N  
 R G W V F T G R I S P R T Q P W L N E H A V E S A V L F P G T G F V E L A L H V A D R A G Y S S V N E L I V H P L L L  
 A G H D T A D L Q I T V T D T D D M G R Q S L N I H S R P H I G H D N T T G D E Q P E W V L H A S A V L T A Q T T D H  
 N H L P L T P V P W P P P G T A A I E V D D F Y D D L A A Q G Y N Y G P T F Q G V Q R I W R D H A T P D V I Y A E V E L  
 P E D T D I D G Y G I H P A L F D A A L H P L L A L T Q P P T N D T D D T N T A D T G D Q V R L P Y A F T G I S L H A T  
 H A T R L R V R L T R T G A D A I T V H T S D T G A P V A I I D S L I T R P L T T A T G S A P A T T A A G L L H L S W  
 P P H P D T T D T D T D A L R Y Q V I A E P T Q Q L P R Y L H D L H T S D L H T S T E A D V V V W P V P V P S  
 N E E L Q A H Q A S D T A V S S R I H T L T R Q T L T V V Q D W L T H P D T T G T R L V I V T R H G V S T S A H D P V P  
 D L A H A A V W G L I R S A Q N E H P G R F T L L D T D D N T N S D T L T T A L T L P T R E N Q L A I R R D T I H I P R  
 L T R H S S D G A L T A P V V V D P E G T V L I T G G T G T L G A L F A E H L V S A H G V R H L L L T S R R G P Q A H G  
 A T D L Q Q R L T D L G A H V T I T A C D I S D P E A L A A L V N S V P T Q H R L T A V V H T A A V L A D T P V T E L T  
 G D Q D Q V L A P K I D A A W Q L H Q L T Y E H N L S A F I M F S S M A G M I G S P G Q G N Y A A A N T A L D A L A D  
 Y R H R L G L P A T S L A W G Y W Q T H G L T A H L D V D L A R M T R L G L M P I A T S H G L A L F D A A L A T G Q  
 P V S I P A P I N T H T L A R H A R D N T L A P I L S A L I T T P R R R A A S A A T D L A A R L N G L S P Q Q Q Q O T L  
 A T L V A A A T A T V L G H H T P E S I S P A T A F K D L G I D S L T A L E R L R N T L H N T G L D L P P T L I F D H P  
 T P H A V A E H L L E Q I P G I G A L V P A P V V I A A G R T E E P V A V V G M A C R F P G G V A S A D Q L W D L V I A  
 G R D V V G N F P A D R G W D V E G L F D P D P A V G K T Y T R Y G A F L D D A A G F D A G F F G I S P R E A R A M D  
 P Q Q R L L E V C W E A L E T A G I P A H T L A G T S T G V F A G A W A Q S Y G A T N S D D A E G Y A M T G G A T S V  
 M S G R I A Y T L G L E G P A I T V D T A C S S L V A I H L A C Q S L R N N E S Q L A L A G G V T V M S T P A V F T E  
 F S R Q R G L A P D G R C K A F A A T A D G T G F G E G A A V L V L E R L S E A R R N N H P V L A I V A G S A I N Q D G  
 A S N G L T A P H G P S Q Q R V I N Q A L A N A G L T H D Q V D A V E A H G T G T L G D P I E A S A L H A T Y G H H H  
 T P D Q P L W L G S I K S N I G H T Q A A A G A A G V V K M I Q A I T H A T L P A T L H V D Q P S P H I D W S S G T V R  
 L L T E P I Q W P N T D H P R T A A V S S F G I S G T N A H L I L Q Q P P T P D T T Q T P N T T G S D P A V G S D P A  
 V G V L V W P L S A R S A P G L S A Q A A R L Y Q H L S A H P D L D P I D V A H S L A T T R S H H P H R A T I T T S I E  
 H H S E N N H D T T D A L A A L H A L A N N G T H P L L S R G L L T P Q G P G K T V F V F P G Q G S Q Y P G M G A D L Y  
 R Q F P V F A H A L D A C D A A L Q P F T G W S V L A V L H D E P E A P S L E R V D V V Q P V L F S V M V S L A A L W R  
 W A G I T P D A V I G H S Q G E I A A A H V A G A L T L P E A A V V A L R S R V L T D L A G A G A M A S V L S P E E P  
 L T Q L L A R W D G K I T V A A V M G P A S A V V S G D T T A I T E L L I T C E H E N I D A R A I P V D Y P S H S P Y M  
 E H I R H Q F L D E L P E L T P R P S T I A M Y S T V D G E P H D T A Y D T T M T A D Y W Y R N I R N T V R F H D T V  
 A A L L G A G E Q V E L E L S P H P V L T Q A I T D T V E Q A G G G G A A V P A L R K D R P D A V A F A A A L G Q L H C  
 H G I S P S W N V L Y C Q A R P L T L P T Y A F Q H Q R Y W L L P T A G D F S G A N T H A M H P L L D T A T E L A E N R  
 G W V F T G R I S P R T Q P W L N E H A V E S A V L F P G T G F V E L A L H V A D R A G Y S S V N E L I V H P L L L A  
 G H D T A D L Q I T V T D T D D M G R Q S L N I H S H P H I G H D N T T G D E Q P E W V L H A S A V L T A Q T T D H N  
 H L P I T P V P W P P P G T A A I E V D D F Y D D L A A Q G Y N Y G P T F Q G V Q R I W R D H A T P D V I Y A E V E L P  
 E D T D I D G Y G I H P A L F D A A L H P L L A L T Q P P T N D T D D T N T A D T G D Q V R L P Y A F T G I S L H A T H  
 A T R L R V R L T R T G A D A I T V H T S D T G A P V A I I D S L I T R P L T T A T G S A P A T T A A G L L H L S W P  
 P H P D T T D T D T D A L R Y R V I A E P T Q Q L P R Y L H D L H T S D L H T S T E A D V V V W P V P V P S N  
 E E L Q A H Q A S D T A V S S R I H T L T R Q T L T V V Q D W L T H P D T T G T R L V I V T R H G V S T S A H D P V D  
 L A H A A V W G L I R S A Q N E H P G R F T L L D T D D N T N S D T L T T A L T L P T R E N Q L A I R R D T I H I P R L  
 T R H S S D G A L T A P V V V D P E G T V L I T G G T G T L G A L F A E H L V S A H G V R H L L L T S R R G P Q A H G A  
 T D L Q Q R L T D L G A H V T I T A C D I S D P E A L A A L V N S V P T Q H R L T A V V H T A A V L A D T P V T E L T G  
 D Q L D Q V L A P K I D A A W Q L H Q L T Y E H N L S A F I M F S S M A G M I G S P G Q G N Y A A A N T A L D A L A D Y  
 R H R L G L P A T S L A W G Y W Q T H G L T A H L D V D L A R M T R L G L M P I A T S H G L A L F D A A L A T G Q P

FIGURE 14(continued)

VSIPAPINTHTLARHARDNTLAPILSALITTPRRRAASAATDLAARLNGLSPQQQQQTLA  
 TLVAAATATVLGHHTPESISPATAFKDLGIDSITALELRNLTHTNGLDLPPTLIFDHPT  
 PHAAEHLLEQIPGIGALVPAPVIAAGRTEEPVAVVGMACRFPGGVASADQLWDLVIAG  
 RDVGNFPADRGWDVEGLFDPPDAVGKTYTRYGAFLDDAAGFDAGFFGISPREARAMDP  
 QRLLLEVCEWEALETAGIAPAHTLAGTSTGVFAGAWAQSYGATNSDDAEGYAMGGATSV  
 SGRIAYTLGLEGPAITVDTACSSLVIAHLACQSLRNNESQLALAGGVTVMSTPAVFTEF  
 SRQRGLAPDGRCKAFAAATADGTGFGEAABLVLERLSEARRNNHPVLAIVAGSAINQDGA  
 SNGLTAPHGPSQQRVINQALANAGLTHDQVDAVEAHGTTLGDPIEASALHATYGHHT  
 PDQPLWLGSIKSNIGHTQAAAGAVVKMIAITHATLPATLHVDQPSPHIDWSSGTVRL  
 LTEPIQWPNTDHPRTAAVSSFGISGTNAHLILQQPPTPDTTQTPNTTGSDPAVGSDPAV  
 GVLWPLSARSAPGLSAQAARLYQHLSAHPDLDPIDVAHSLATTRSHHPRATITTSIEH  
 HSENNHDTTDALAAHLHALANGTHPLSRGLLTPQGPGKTVFVFPQGGSQYPGMGADLYR  
 QFPVFAHALDACAALQPTGWSVLAVLHDEPEAPSLERVDVQPVLF SVMVSLAALWRW  
 AGITPDAVIGHSQGEIAAAHVAGALTPEAAAVVALRSRVLTDLAGAGAMASVLSPEEPL  
 TQLLARWDGKITVAAVNGPASAVVSGDTTAITELLITCEHENIDARAI PVDYPSHSPYME  
 HIRHQFLDELPPELTPRPSTIAMYSTVDGEPHDTAYDTTMADYWYRNIRNTVRFHDTVA  
 ALLGAGEQVFLELSPHPVLTQAITDTVEQAGGGGAAVPALRKDRPDAVAFAAALGQLHCH  
 GISPSWNVLYCQARPLTLPTYAFQHQRYWLLPTAGDFSGANTHAMHPLLDTATELAENRG  
 WVFTGRISPRTOPWLNEHAVESAVLFPGTGFVELALHVADRAYSSVNEIVHTPLLAG  
 HDTADLQITVTDTDMDGRQSLNIHSRPHIGHDNTTGDEQPEWVLHASAVLTAQTTDHNH  
 LPLTPWPWPPGTAAIEVDDFYDDLAAGQGNYGPTFQGVQRIWRDHATPDVIYAEEVPL  
 DTDIDGYGIHPALFDAAHLPLLALTQPPNTDDNTADTGDQVRLPYAFTGISLHATHA  
 TRLRVRTRGADAITVHTSDTTGAPVAIIDSLITRPLTTATGSAPATTAAGLLHLSWPP  
 HPDTTDTDTDALRYQVIAEPTQQLPRYLHDLHTSTDHTSTTEADVVWVPVPSNE  
 ELQAHQASDTAVSSRIHTLRTQTLTVVQDWLTHPDTTGTRLVIVTRHGVSTSADHPVPL  
 AHAAVWGLIRSAQNEHPGRFTLDDNTNSDTLTTALTLPTRENQLAIRRDTIHPRLT  
 RHSSDGALTAVVVDPEGTVLITGGTGTGLFAEHLVSAHGVRLLLTSRRGPQAHGAT  
 DLQQLTDLGAHVTITACDISPDEALAALVNSVPTQHRLTAVVHTAAVLADTPVTELGD  
 QLDQVLAPKIDAAWQLHQTYEHNLSAFIMFSSMAGMIGSPQGNYAAANTALDALADYR  
 HRLGLPATSLAWGYWQTHGLTAHLDVDLARMLGLMPIATSHGLALFDAALATGQPV  
 SI PAPINTHTLARHARDNTLAPILSALITTPRRRAASAATDLAARLNGLSPQQQQQTLAT  
 LVAAATATVLGHHTPESISPATAFKDLGIDSITALELRNLTHTNGLDLPPTLIFDHPTP  
 HAAEHLLEQIPGIGALVPAPVIAAGRTEEPVAVVGMACRFPGGVASADQLWDLVIAGR  
 DVVGNFPADRGWDVEGLFDPPDAVGKTYTRYGAFLDDAAGFDAGFFGISPREARAMDPQ  
 QRLLLEVCEWEALETAGIAPAHTLAGTSTGVFAGAWAQSYGATNSDDAEGYAMGGATSVMS  
 GRIAYTLGLEGPAITVDTACSSLVIAHLACQSLRNNESQLALAGGVTVMSTPAVFTEFS  
 RQRGLAPDGRCKAFAAATADGTGFGEAABLVLERLSEARRNNHPVLAIVAGSAINQDGA  
 NGLTAPHGPSQQRVINQALANAGLTHDQVDAVEAHGTTLGDPIEASALHATYGHHTP  
 DQPLWLGSIKSNIGHTQAAAGAVVKMIAITHATLPATLHVDQPSPHIDWSSGTVRL  
 TEPIQWPNTDHPRTAAVSSFGISGTNAHLILQQPPTPDTTQTPNTTGSDPAVGSDPAV  
 VLVWPLSARSAPGLSAQAARLYQHLSAHPDLDPIDVAHSLATTRSHHPRATITTSIEH  
 SENNHDTTDALAAHLHALANGTHPLSRGLLTPQGPGKTVFVFPQGGSQYPGMGADLYRQ  
 FPVFAHALDEVAAAALNPHLDVALLEVMSQQDTAMAQLDQTFYAOPALFALGTALHRLF  
 THAGIHPDYLLGHSIGELTAAYAAGVLSLQDAATLVTSGRQLMQSCTPGGTMLALQASEA  
 EVQPLLEGLDHAVSIAAINGATSIVLSGDHDSLEQIGEHTQDRRTTRLQVSHAFHSPH  
 MDPILEQFRQIAAQLTFSAPTLPILSNLTGQIARHDQLASPDYWTQQLRNTVRFHDTVA  
 LLGAGEQVFLELSPHPVLTQAITDTVEQAGGGGAAVPALRKDRPDAVAFAAALGQLHCG  
 ISPSWNVLYCQARPLTLPTYAFQHQRYWLLPTAGDFSGANTHAMHPLLDTATELAENRGW  
 VFTGRISPRTOPWLNEHAVESAVLFPGTGFVELALHVADRAYSSVNEIVHTPLLAGH  
 DTADLQITVTDTDMDGRQSLNIHSRPHIGHDNTTGDEQPEWVLHASAVLTAQTTDHNH  
 PLTPWPWPPGTAAIEVDDFYDDLAAGQGNYGPTFQGVQRIWRDHATPDVIYAEEVPL  
 TDIDGYGIHPALFDAAHLPLLALTQPPNTDDNTADTGDQVRLPYAFTGISLHATHAT  
 RLRVRTRGADAITVHTSDTTGAPVAIIDSLITRPLTTATGSAPATTAAGLLHLSWPPH  
 PDTTDTDTDALRYQVIAEPTQQLPRYLHDLHTSTDHTSTTEADVVWVPVPSNEE  
 LQAHQASDTAVSSRIHTLRTQTLTVVQDWLTHPDTTGTRLVIVTRHGVSTSADHPVPLA  
 HAAVWGLIRSAQNEHPGRFTLDDNTNSDTLTTALTLPTRENQLAIRRDTIHPRLTR

FIGURE 14(continued)

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HSSDGALTAPVVVDPEGTVLITGGTGLALFAEHLVSAHGVRLHLLTSRRGPQAHGATD  
 LQQRLTDLGAHVTITACDISPDEALALVNSVPTQHRLTAVVHTAAVLADTPVTELTGDQ  
 LDQVLAPKIDAQWQLHQLTYEHNLSAFIMFSSMAGMIGSPQGNYAAANTALDALADYRH  
 RLGLPATSLAWGYWQTHGLTAHLTDVDLARMTRGLMPIATSHGLALFDAALATGQPVS  
 IPAPINTHTLARHARDNTLAPILSALITTPRRAASAATDLAARLNGLSPQQQQTLATL  
 VAAATATVLGHHTPESISPATAFKDLGIDSITAELRNTLTHNTGLDPPTLIFDHPTPH  
 ALTQHLHTRLTQSHTPVGPIASLLSHAIDEKFRAZADLMAASNLNQSFSNMAELNQLP  
 AVTDIADASPDGLLTICISTSENEYARLAAANIHSLTFAEIAAPGFYDAQLPNSIETSA  
 EALATAITGAYANTSIVLVAHSIVCELAQATMTRLQDADIDLVGLVLLDPLEGTNSTEDY  
 VETVLTREHINAPRVGVDGYLAALGRYLQFHEDRRIPIPETRHMTLHSDTKIDRAQTPM  
 NLLQDEAALTALKIGNWMNDVGVALSVNLE\*

## FIGURE 14(continued)

## Mup045 protein

VIWNIDYIISGTGRFIPSMRPIINDIQVDPVNDHTIVQSDYIISFTEADEPATVMTRAATE  
 ALTTSELVSADGVLIYAAIIGDAHHFAPVCHVQRVLRAPDALAFELSAASNGGTQGIAV  
 AANLMTADASVKAALVCTAYRHPIDIISRWSSGMVFGDAAAVALSRDGGMVRLISGYHG  
 SLPELEVLRNRSNERLGFVLPDVGKYLTAIARMYQAVIAQVLEEAQTSIAEIDYFGL  
 IIGIGIPSLTATILEPNGIPVNKTSGLLRQMGHVGACDPLLSNLHFEQNVLKRGDKVLL  
 LGGGVGYRLTCIVAEIAMNPVGPGHSTS\*

## FIGURE 15

## Mup053 protein

VRQRNLWIAAHGLLRGTARLAARLGDVQSRLVADPMVMANPAPFCDELRAIGPVVSSYGT  
 HLVVSHAIACHELLRSEDFEVVSLGSNLPAPMRWLERTRDDTPHLLLPPSLLAVEPPNHT  
 RYRKAVSSVFTPKAVALRDHVEETASALLDQLTDQASAVDIIARYCSQLPVAVICDILG  
 VPSRDRNRVLKFGQLAGPCLDGGLTWRQHQVRQGLQGLHFITEHLEELSNPGDDLMS  
 QMIHASENGSSETHLHATEVRMIGLVLGASFATTMDLLNGNGIQVLLDAPELRDALSQRPQ  
 LWPNAVEEILRLEPPVQLAGRMARKDTEVAGTAIKRGQLVIAIYLGAVNRDPSVFADPHRF  
 DITTRANANRHLAFSGGRHFCLGAALARVEGEVGLRMLFERFPDVRAAGPGNRRDTRTLRG  
 WSQLPVQLGAARSMAIR\*

## FIGURE 16

## Mup038 protein

MIVWPEVVSTVVVDGVAMSALVAEPDQEPKAVILALHGGATNARYFDCPGHRLALSLLHT  
 GAAAGFTVVALDRPGYGSAGDPDAMNRPHQRAALAYGALDRILAQRPRGAGVFIMGHSN  
 GCELAMWMATETRGAELLGIELAGTGWHYQPEAREILTTATGEHRWVGLYDLIWHPQRLY  
 PPEVLAIAIISSSAPAYEEQMMADWTRRTFLELVPAVRVPHFSIAQHEKVWQRDSSALD  
 EIAVLFGAPRFLHEQPEAGHNISLGHGTDYHTVLSFVQQCLAERLANAQDVLAA  
 E\*

## FIGURE 17

atgcggcggccac cgagcggtgtt tgcggccctg gaactcgaca ccaacaggtt caccgggtgtg 60  
ccgtgctgga gcgcgtggcc cgcggactgg gcccacaaca cgcgtcggtt ggcctacgac 120  
ctgcgtatc aacagatccg gtgcgtatg tgcgtggcc gcatcgcccc aaaaacccctg 180  
atcgctatcg cccggccatc ggcaacgtac gcccactggaa caccggcccg caactgccc 240  
cccccaaca aacgatcgaa agcgcgacaa ggcgttcacc acgcgacatc ccaggccgg 300  
cacaatggc taacgttact cgggggtggct accggagggtgc tgcgcggcc ccaacgcacc 360  
tacatcgagc gcatggctc ctggagaatg ggcatcgcc acccggtgtc acccggtgtc ggcgtccgt 420  
tgggactac acgacaacgg cgaggtcgca cgggttgc tgcgtttac accccacccgt 480  
gaacggctct cagaataccac acacccatca cttaaaacaa gctgttttac taccaccccg 540  
ggcgcacac ggcggccggaa aaggcggtc acgcgcggca acaggccca cggccggggc 600  
ccggactgtc cggctcaatg gcgagcagac cccatgtc ccccatggac tcgtcggtac 660  
agccctacga gctggtcagc aatgtcgct gccccccgag ccgcgggttgc gactgcacgc 720  
gacctgaccg cattggtaca agactggctc gttaccggc accgaatacc gtccactcca 780  
gcccggccga tcggccctgt cggcacatcg cttgtcggtc atacagggca caacacgtac 840  
caacaccggc cagctgact cggagaagca cgcggggccg cagacgtgc cgcgggtcg 900  
aaacggatc aaaaacaaac cgctgaacac acgcggccaa tcgcggccgc agaaggccgc 960  
cgccggccac tggggcggtc cggccacccag gcccggagaa ttgctggccg tgctgtgtc 1020  
cgcaacgcgg cccgacggcg caccaaaatg gtgcggccag aagttagcgg cgtcgatgc 1080  
gcgtatcgcc gggccggcg cccgtaaaccc acggccctac gctgacagca gttcggtcg 1140  
atcgagcagc gatgtggcc tgcgtccatc caactccccc gatgtcgatcc ttgtcggtc 1200  
agctaccggc accgttccg tcagcaactg ggcgcgttgc cgaataagag cggcaactt 1260  
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gcaaccctgc tgcgcacac ggcgtcatgt aaggccagaat tttgctcgc ccaacttccc 1560  
atcgcccccc aagaacccgtg gagagcggc ttgtgaatgc gatatacgcc cggccgttgc 1620  
gcaatcgccg actggtaaac atgtaaatgaa gtttgcataa gacgagggtt ttgcataacc 1680  
gatctcgccg cgcgtgtcact gaaagtggcg caggacttta ttacatacc ccctctgtc 1740  
caagaatggg accgtgtcat cgcggcggcg accgtcgccg tatacgctcg cccatcgccg 1800  
caagcgttg ggcgttccgg cccagcgctg gaggccaaatg ctgagcggcg gcgagtcg 1860  
aggccggccaa tatccaaac aacgggttcc caagaacgcg gtgcgttgc gggaaatgtc 1920  
gctcgaccgg gagttggcact gagaagggtc cactcccccgg ccacgtcaact caccgacaca 1980  
acaacccggc cccggggccg atcaggggta cctcgccaa tggtgagcc gccgggaagc 2040  
gcgcgtcaac ggcgtgcgc acgaaactcaa aatggccgc gacctcgctc gacagcatgc 2100  
cagcgcacgg cgtcgaaaagg cccgacagct gtatgtcgaa ctgcgcgcac tgaccatcca 2160  
gcaggtgtaa ctcatcgaa ggtaaaaga ggcactcgca gttgaatccg aacgtatccg 2220  
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ttgagcacag gggcgatcca cgtcgatcg gtatcgaaatc ccaacttgc gccgtgtgt 2400  
tcgatgactt cctctgtc ggggttcaga ctaaaacgcgc tctgcgcgc tccacccaccg 2460  
agatagcgcg cggccgaagg gtccggccggg aaaagggtcg ggttaggtgc agtcgagtac 2520  
cggtcttcgt cgtatctc gggccaggta cccacgtgttgc atttgtatgc gatccctcc 2580  
aaaaccacat gcaatttggt tgacttcacg tttgccccgg ggggtcttg ggggtcttg 2640  
acgcccaggac tgacatatac cgcgggtgtc ggttggacc gatgtcggtt cggccaggc 2700  
ttgcgtcgcc gcaacttggc gggcgagaca tcagagggtc tagaggccgt tgccgcacc 2760  
ggtctgtctt caacaggatc ctcgcacgca gctgttcgg gacactggc gggccgggc 2820  
tgggtcgctg tgcagggatc agttagacca ggcggccgc tcttcgggt tggtaggtct 2880  
gcgagatccg ctggggccgc ctccgtcgcc gttaaacttgc tcacggccac actccctcg 2940  
tgatcaggatc ctggggatc tttgaaaccc gctgtgagaat ttcccggtc agcttggcga 3000  
agtccctccgc caccgtcaca gatgtcgatc tgacgaccgt agtcgatctc gtcctccct 3060  
gcccgtatcg tgaccggagc ggattttgtc cggatcttcg ctaaggatcg tggcccaacc 3120  
gaccacactt aggacatcg ctcggccaaatc ctctgtatgc gccgtatgcgaaatcgac 3180  
tcacgtatc gttctggccc aatctcgatc ccacattctt ctatcatctc tcccgatcc 3240  
tcgtcgatga agttccgtac gcaaaacacga gctgtgagaat ttcccggtc agcttggcga 3300  
gctcgccat cggccctttaga tcgcgtcgca acgcgcacatc gtcgtcgatctc gtcctccct 3360  
cggtcttcgt cggaaactaca aaaaacccgcg cggccgtatcg caccgtatcg tggcccaacc 3420  
gggtctccgg agggaaatc atgaagataa ccccgtaatg atcactgtatc tggcccaacc 3480  
ccacggccgc caccatcgac acctgtttgg cgtgtcgcc gttccggatc tctgcagcc 3540  
tcacccggcgc gatccgcacgg acgaaaggcc caccggaaac aacatccaaat cccggacgga 3600  
catcgggaaat cggggtcaac gcagcggccgg cgtatctcgatc gtcgtcgatctc gtcctccct 3660  
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gatcgaccaa taaggcgcgc gtcctccatcg aggacacgag cgcggccgt gttgttagaaac 3780  
acgtcgactt cccatccca cccctggccgt tggccggacaa ataaacatcg cccacgttgc 3840  
tccaatttgc cgggggttct accagcccg cgtgtccca aacggctacg cttctactca 3900

**FIGURE 18**

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tgcggggcgc ttactgtgtt ggaatcgaaa gaatggcgcc cctggcatgc cgccgaccga 3960  
 accgcactgc accccacgcg ctgtcacggt ctgcagagtc tagggcgatc agctcggtgt 4020  
 catatcccta ctctgttccg gtgcgcacca tcgcgtgcca cttgggtgac tatgacccat 4080  
 cgtgcggcca atgcccacagc gtctcgccca gcaaacccaa cccaccatg gaccccccggc 4140  
 gtcgttcagg cgaacgcctg aagccgcctt cggcaccagg tgccggatca cgcgatgtcc 4200  
 accgcgttgcgt gcaccgttcc ggccagagca aaccaggcta tacaggca aacggcgccg 4260  
 tgcataatagg gtctgccaat gctctaaccg gaacagtca cctggccat caccgcacgt 4320  
 caaacggctg gaccgacgcg attcaccgcg cgacacaata cctatataaa tacctgcccac 4380  
 cgtacctgac tgcaagggtgt aactcatatc attaccactg cgaggcgccg cacttgaact 4440  
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 cggccagcaa cccgttgcg tcccgccgt aaaggacat tggggccatc atccgcatacg 4560  
 cggatgtcgc cataatttt ttcgtcccaac ggcgtgtcgc tctaccgcac acgctgcccc 4620  
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 cccgactaaca tgcgtatgcgt gacccacac caaacccat tgcgcgcacca ggtcgaatcg 4860  
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 acccaggatc ttagatatgg cagcaataaa gtgcgcgcac acatgcttag atgcccattga 4980  
 ggtatgtcgc ttaaagcgctg ctcaacgtt gcttcacactg ctgcgcagcg gtatcgcc 5040  
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 gccggaaaatg cccacccggc ccacaggccg tcgatcagggtt ctttgcgtt tgggggtggg 5820  
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 agggccacct tgggtgtgt tgcgtgggtt tggccgttgc ggctcgccgtt ccacgtccgg 6060  
 atcgcgttgcgtt cccacccgggtt tcgcgcata tcggccgcacca tcgatgtatc ttgttgcgtt 6120  
 tcggccgtca gaaattccat cccgtgggtt ggcgttgcatt tcggccgcacca gcccggatcg 6180  
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 ctcatcgagg atgctgaaca gatccggcgtt tcggccgttgc ggtgttgcac ggcggccat 6300  
 attgtccctt cctgggttgc acgcggccggg tgcgttgcgtt tcgcgttgcgtt ccacgtccgg 6360  
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 gcccggcacc catcatcggtt cccggccacc gatcggtcg gcccacgtgc tggattgcgt 6600  
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 gcccggccgg tggccgttgcgtt tcgcgttgcgtt tcgcgttgcgtt tcgcgttgcgtt tcgcgttgcgtt 6840  
 acatggtagg ccacgcacatc gatccgttgc ccccaagac ctttttcgac atcgccgtatc 6900  
 cgcaggccgc cccaggccgtt tcgcgttgcgtt tcgcgttgcgtt tcgcgttgcgtt tcgcgttgcgtt 6960  
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 agcgtgtgtt tcgcgttgcgtt tcgcgttgcgtt tcgcgttgcgtt tcgcgttgcgtt tcgcgttgcgtt 7200  
 tcgttgcgtt tcgcgttgcgtt tcgcgttgcgtt tcgcgttgcgtt tcgcgttgcgtt tcgcgttgcgtt 7260  
 tggccgttgcgtt tcgcgttgcgtt tcgcgttgcgtt tcgcgttgcgtt tcgcgttgcgtt tcgcgttgcgtt 7320  
 cccaggccgtt tcgcgttgcgtt tcgcgttgcgtt tcgcgttgcgtt tcgcgttgcgtt tcgcgttgcgtt 7380  
 tggccgttgcgtt tcgcgttgcgtt tcgcgttgcgtt tcgcgttgcgtt tcgcgttgcgtt tcgcgttgcgtt 7440  
 tggccgttgcgtt tcgcgttgcgtt tcgcgttgcgtt tcgcgttgcgtt tcgcgttgcgtt tcgcgttgcgtt 7500  
 tcaaggccgtt tcgcgttgcgtt tcgcgttgcgtt tcgcgttgcgtt tcgcgttgcgtt tcgcgttgcgtt 7560  
 gcccacatgt gatcggtgtt tcgcgttgcgtt tcgcgttgcgtt tcgcgttgcgtt tcgcgttgcgtt 7620  
 tttagtcaacg tgggtgtgtt gactcggttgcgtt tcgcgttgcgtt tcgcgttgcgtt tcgcgttgcgtt 7680  
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 ccgttttcgtt tcgcgttgcgtt tcgcgttgcgtt tcgcgttgcgtt tcgcgttgcgtt tcgcgttgcgtt 7800  
 gcccggccgtt tcgcgttgcgtt tcgcgttgcgtt tcgcgttgcgtt tcgcgttgcgtt tcgcgttgcgtt 7860

FIGURE 18(continued)

tttgtgctgg ctcaatggc tgatgcggc gaaagtggc acaagtctgc ccagttgatc 7920  
 gccaccaccc tgagactgca ggagccggg attgacacgt tcacgcccac cccgcctgat 7980  
 cgatctcggtt gatcccagc ggtatgtgt cgccgtttt gccgcccggag 8040  
 gaggagaaca agactgtcga tgacggcgtc tacgaccacc tagggatcgt gcacttcggc 8100  
 ggtatctcg tccggcgtca ggcgatgtc aagtcggcag gcttcagca ggctgtctac 8160  
 accgttaccg ctgacgtcta cgaggccggc gacgcccggag cccgtcagcg catcggtg 8220  
 gagttggcgg cccaaggcgat cgatgcggc ttatgtggcgg ccacccgggtgt gcagggtatg 8280  
 cccaaggccc gctgccttgg tacgcctata cggtgcaaggg gggagacctg gctgttgggt gctgtggcggc 8340  
 tacgcctata cggtgcaaggg gacgagggc gccgtgcatc agatggtcgc ggcgcaatac 8400  
 cgatctcgta cggggaaagta gatctggccg tggcgttgc ttttagaacc gtgggtggccg 8460  
 gctatgtcat cgagggggtg atcccacgtc gcccgcgtct gatgcctca agatcttcg cggccgtctg tctcaggatg 8520  
 aacaatttcg ggtgcgggtc atccgcgaag ccgacttgc cgcgacactg agccacccca 8640  
 atatcgtcac cgtgttcaac cgccggaaa ccgacgacgg tcagctgtgg atagcgatgc 8700  
 aatacgtcg gggaaactacc gctgtcgatc tgacgcgcac ggtactgtacc cccggcgcggg 8760  
 tggccgcgtat catactgtat tacaccgcga ctaaagccg gtcgcgcag cgttgcacta tgcgcattcg cccgcgtgtc 8820  
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 ggcgcgacgt ctattcgctg gatgtgcgc tggtccgggt gttgaccggc cgcgcctccct 9060  
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 gcccgcgcaac cctggcggc gtcgcgtatc gtcgcgtgg 9240  
 agctacatca cggccgggtg tattccatgtc gtcgcgtatc gtcgcgtgg 9300  
 tattccatgtc gtcgcgtatc gtcgcgtgg 9360  
 tggcccccattt ggtgaatacc cccgcgcac gtcgcgtatc gtcgcgtgg 9480  
 ccggagacgac gccggatctg agctggcgcc catcgacaccc gtcgcgtatc gtcgcgtgg 9540  
 gtcgcgtatc gtcgcgtgg 9600  
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 gtcgcgtatc gtcgcgtgg 9960  
 ttctcaacaa cggcgtcgcc gtcgcgtatc gtcgcgtgg 10020  
 gcaagacatc caccgtggc aacccatgtc gtcgcgtatc gtcgcgtgg 10080  
 cccgcgcac gtcgcgtatc gtcgcgtgg 10140  
 gcccacga tccaccccgaa gtcgcgtatc gtcgcgtgg 10200  
 aaatgaccga tgcgtatgatt gtcgcgtatc gtcgcgtgg 10260  
 gccgtctacc aagcaagttc gtcgcgtatc gtcgcgtgg 10320  
 ccacattac cgcgtctacc gtcgcgtatc gtcgcgtgg 10380  
 tggtaacaca accgtccccac gtcgcgtatc gtcgcgtgg 10440  
 gtcgcgtatc gtcgcgtgg 10500  
 agtgcgtat cgcgcgtca gtcgcgtatc gtcgcgtgg 10560  
 ctcagaaagg tgcgtcgctt gtcgcgtatc gtcgcgtgg 10620  
 gtcatagcggtt gtcgcgtatc gtcgcgtgg 10680  
 actgtggctc accgagttga gtcgcgtatc gtcgcgtgg 10740  
 gtcgcgtatc gtcgcgtgg 10800  
 ccaaaacaaatc caagccgca gtcgcgtatc gtcgcgtgg 10860  
 cagccggccgca atgaacccaa gtcgcgtatc gtcgcgtgg 10920  
 tcggttgcgt gcccggcgtt gtcgcgtatc gtcgcgtgg 10980  
 ggaacgcacac tccaccccgaa gtcgcgtatc gtcgcgtgg 11040  
 gtcgcgtatc gtcgcgtgg 11100  
 ccgaccagca gaatttagggt gtcgcgtatc gtcgcgtgg 11160  
 agtgcgtatc accggcgcgtt gtcgcgtatc gtcgcgtgg 11220  
 cgggttgcgtt gtcgcgtatc gtcgcgtgg 11280  
 gcccgtgagc gcaactggaca gtcgcgtatc gtcgcgtgg 11340  
 ttgagcggcc catatggccg gtcgcgtatc gtcgcgtgg 11400  
 ccgcttggagg aggcgacgtt gtcgcgtatc gtcgcgtgg 11460  
 caggcaaaag aaaccgggtt gtcgcgtatc gtcgcgtgg 11520  
 cgcgccttagg aatggccatt gtcgcgtatc gtcgcgtgg 11580  
 acccaagcgca ctggccgggg caacaaccccg gtcgcgtatc gtcgcgtgg 11640  
 cgcgcgtggagg gtcgcgtatc gtcgcgtgg 11700  
 cagggtggatg ggacccttga gtcgcgtatc gtcgcgtgg 11760  
 cgcgcgcgca gtggccacac gtcgcgtatc gtcgcgtgg 11820

FIGURE 18(continued)

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cgtgaacacc acagcgatgc cggccaggc gagcccattc gccagcaccc gcacccacca 11880  
 tggcccacg acaagtcgtg cccacaagcc cgagatcaac accgctgcct getctcggtta 11940  
 gccccgtgc agatctggtg cagcgccttgc tcgaaaacgg tgcgaggag ttgggggttc 12000  
 ccggagctat ccgaggccgc gacgacgagt ctggatgtgc gagcgttagta gacatagcgt 12060  
 gttcaactgg gcagcaggcgc gtcgtcgctg taggtgaccg tcactgcata gcgaaagcgg 12120  
 tgcggcccggt gcaaggatgc cgagtctca aggacacgca ccgtaaagcg ggcgggtgccg 12180  
 aaaggctggc gggcgatgaa ccgcccacac cgcgagaccc gggcggatc gtcgggtgaac 12240  
 agggctgggt tgaattcccg gctgatctgg atctggagg tgcgacactc gttggacactcg 12300  
 gtcgggtgac caggcgcata ttgtgcata tcagctgcgg gggagggcgt caccgtcccc 12360  
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 gtcaccggcc gggggatgc ggtctgcact ggttagcact cagctagaccc ttccaccgtcg 12540  
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 acggcgtagg cggttagcgt gatcgcata atcagcagca cggcggatc ggcgtgtacc 12660  
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 cggcgagtcg ggcacccatg tcgacactgtt cgcgggttagg attcgtggcg cactccagca 12780  
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 cagcgttgc cccggatcg atggacggcggg ccatcatc ac gtcgcaccc tgggtgtggcc 13440  
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 agtcacacat gggatgcgcg gcccctcaacc ggacccaccc cgggtggatcc gtggggtcca 15540  
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 tcgtggggccca caccacccat ggccttccaa cccgggtttt gtcgggttcc aggtgtggccg 15660  
 tatccacccgg ccacacccaa cacttgcgcg catcgccgt caccatgcgcgat cgcggccgca 15720  
 ttagtgcgtcg cagcgtcgatc agtgcgttgc tcatcaccac cgtcgccgg 15780

FIGURE 18(continued)

tcaaccaaac	ccggcgcgcgc	cctcaccac	accacaccga	ctgtctcgc	acagccaccg	15840
tccactacga	cgaccccgcc	cccgcccccg	cccatcgcgc	cgcgacgcct	ggcagggctg	15900
ctgctcgaca	cagacaccat	caacgcgctg	ataaaactccg	gagaacttagc	ggtggaccca	15960
aagcacacga	cgacgaagtt	gttaccgcac	accggcggacc	acccggcatg	cggcggagtg	16020
ttggtcaacg	ccagcaaaca	ggcttacgcac	ggcagcggat	gggtcgcgc	gcaaacccaa	16080
gccctcgctg	acaacaccac	ccgacaacac	gtcgcttacg	aatcggtaat	cagctatccc	16140
tcagcacgca	ccgcccccaa	aatggttgc	caagaaggccc	acaactggca	acgctgcaac	16200
ggccgatcca	taaccaccac	cgccccccgc	tacccggccc	agacttggtt	tgcgcccacc	16260
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gcctgccagc	acgcatttgac	cgcacgcac	aacatcgca	tcgcacattga	ggtatgcgg	16380
gcccacatca	cccatcaagc	caccgcac	gccaacagg	tcgcacaaaa	tgcccaactga	16440
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aacccgtaa	aactcggtgt	cggttttgc	gtgtatgacg	acgaagacaa	gtgggttcagc	16680
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cccggttac	gtcacaccga	tgctctcgag	caagcgcgtg	cacgcctgcg	tcgaggatcc	16860
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aacccggct	acccggcgtc	atccgggttgc	atccgggttgc	ttccaccga	gcagtccg	18480
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cggggccgg	gggtgtcg	cggggcttgc	gttaagggtc	aatacgctt	gtggggccgg	18720
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tttagggcgc	ccgggtcg	tcgacgggc	tgagaggcc	tcgagttc	ggcagggtcg	18960
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ttgcggccgg	tttagagtc	gagcgttggc	gggggtgtcg	atcagcgtg	ttgtttgtt	19140
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tttccttgg	gatcgaaaggc	ccatagtgt	tttgcgggtga	tgcggccgca	cacccggggag	19680
cggtctacgc	cgagcatcg	ggcgcttct	tttatgtga	ccgatctga	gagcgcaccc	19740

FIGURE 18(continued)

gtgagctgt gcaacgcgtat gccccggcg gcccggcggtt cggtgtcgcc cgaccatgcg 19800  
 tcgatcaccg ctgtgttacc gggccggcg ttcgcgcgga ggaagtccac ttctgtcgctc 19860  
 gacagagtgg ctgccccggg gatggccgca aatccggagt cgagttcgcc gaggacctct 19920  
 tcgaccgtca ggtcaatctg gtgtctagcg agtaggcac ccagcgcagg acaagtcgat 19980  
 ccaccatcaa cgacacgtat agcacggtca tgcgggtcacg tgctgttaggc tggtatcgga 20040  
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 ggactgcgcg ccacatcatt tgcggccccc ggcgaaatgc accgacctgc cccgctggac 20160  
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FIGURE 18(continued)

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FIGURE 18(continued)

**FIGURE 18(continued)**

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FIGURE 18(continued)

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FIGURE 18(continued)

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**FIGURE 18(continued)**

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FIGURE 18(continued)

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FIGURE 18(continued)

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**FIGURE 18(continued)**

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FIGURE 18(continued)

**FIGURE 18(continued)**

**FIGURE 18(continued)**

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**FIGURE 18(continued)**

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**FIGURE 18(continued)**

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FIGURE 18(continued)

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FIGURE 18(continued)

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FIGURE 18(continued)

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FIGURE 18(continued)

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FIGURE 18(continued)

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FIGURE 18(continued)

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FIGURE 18(continued)

**FIGURE 18(continued)**

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FIGURE 18(continued)

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FIGURE 18(continued)

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FIGURE 18(continued)

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FIGURE 18(continued)

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 gcccgggtt ggtgtatccg tttttccctc 128520  
 gttgtacccg tttttccctc 128580  
 agccagggtt ggtgtatccg tttttccctc 128640  
 cacggccgtt aatccgggtt ggtgtatccg tttttccctc 128700  
 atgcaggacc cactccgggtt ggtgtatccg tttttccctc 128760  
 gcccgggtt ggtgtatccg tttttccctc 128820  
 tagatccggc tggccgggtt ggtgtatccg tttttccctc 128880  
 cgaggaatccg tggccgggtt ggtgtatccg tttttccctc 128940  
 gaacaccccg ggtgtatccg tttttccctc 129000  
 cccggccgggtt ggtgtatccg tttttccctc 129060  
 atgcatccggc tggccgggtt ggtgtatccg tttttccctc 129120

FIGURE 18(continued)

ctgtatgtgg aaagcgttagg tggcagtgt gaggggccgg gcctggcagt aaagaacatt 129180  
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accccccggc agcaggccggcgcgacatgtt acatggggccg acatgttac gtatgttgc 129420  
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gtcgccgtat aggccccaca ctgcggccgtt gatgttgc gatgttgc ggttgggttca 133200

**FIGURE 18(continued)**

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FIGURE 18(continued)

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attgggtact atcacgttaa taaaaatatg tagtagcgc gttggctgta gtgtggatc 137340  
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 ttttgcgttgc gttttggccg gttttggccg gttttggccg gttttggccg cttttggccg 141360  
 cttttggccg gttttggccg gttttggccg gttttggccg gttttggccg cttttggccg 141420

FIGURE 18(continued)

ccacgttggaa gcttgcgatc ccctgcttag ccttaaccac ctattcgacg agaaatgtcct 141480  
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tgtggctgaa atgcgcattga atcccgccgt gcccgacac tccacttctg agtggaaaagc 141600  
gaagggtgaa gccatgtctg tacgtgcgtc .aaacaggctc ttgcacgttgc gctggcgt 141660  
gagttgtgtc tctgggttgc ggcccggctg tlgcgggtgc agtgaaatgtc tgtcggccgg 141720  
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**FIGURE 18(continued)**

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tctcccccga caccgtggtg caaacctgca tcatccactt gatccgcgc acgttccgt 145560  
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gtcatttgc ggcgttccat 149580

**FIGURE 18(continued)**

cgggctgggt atggcaatgg caactcgcgc aacggaaccc gctcgaaaac ggtgctca 149640  
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 gccgaaggct tagatgcctt cgcacccggaa 150360  
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 aaggtgattt gttcgacca tgccattgaa 150480  
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 cggtcgttag atccaaccgg aaccggac 150600  
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 aaaacgcgcg ttacaccgtt aatcagac 150720  
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 ggcttggcg 150960  
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 aacccggcg 151260  
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 gattcggtcg cggtgatgtt 151860  
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 agtctgcaga 152760  
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 aatggcatca 153240  
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 accccgggtt 153360  
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 gcaactcg 153540  
 gcccgttctg 153600  
 ggcttgcgtt 153660

FIGURE 18(continued)

ggtgatccgg caggcttcgg cgatgttgc ggcgcgttgc aggccgtgca gattgatcgc 153720  
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FIGURE 18(continued)

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cacacagcccatccatcc cctcgtatggc 161820

**FIGURE 18(continued)**

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FIGURE 18(continued)

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 tgtatgtcc gactcgctgg cttgtggatgc ttcccttttc gtcgttgcggatc gtcgttgcgg 168840  
 gctaaagctt gtcggcggtt gggccggccgc catccatgcg gttgttggatc ccgtccggcc 168900  
 Cggccggatc aacttgcgtc tgctcatc caccatgcgatc atgtccatc gcaatgcgc 168960  
 Cgtcagcatc accccccgcgc caatccgcgc cccggccgcgc gtcgttgcggatc cggcgttgc 169020  
 tcccaatggccg gggccggccgc gaaatcgatc cggccggccgc gcaacacccgc cggcattgtt 169080  
 tggccgcgc ttaaccggat cggccatgc accggcccaat cctggaggccgc cgtgttgcgg 169140  
 cactggctgc ggattcatgc gatcaggatgc tgcgtcgatc ggcacatggatc gtcaccgc 169200  
 ttgcggcttc cagacttggc ttcgttgcgc gatgtatccgc tgcaccgc tgcgttgcgc 169260  
 ggcgggttgc tggcccttcgc ccacggccgc cgttgcgtc gccgcgtatc tgcgttgcgc 169320  
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 Ctgtccgc gacaacgcggat tgcgttgcgc gtcgttgcggatc accgacaaatc ccacatgcgc 169440  
 atgcggccca atagcttcgc cgtcaatgc acataatccgc tcgacccatc tcgacaatcat 169500  
 cggacacacc cgttctatgc gtttcacac gtcgttgcgc aatccatgcgatc cggccgtatc 169560  
 cccggatataatccgc tcaatccgcgc tcactgcgc tgcgttgcgc ttcgttgcgc 169620  
 tgcgttgcgc ggcacccgcgc gatcaccatgc cgttgcgttgc gtcgttgcgc ggcggccacca 169680  
 acgtcagcgatc cggccgttgcgc tgcgttgcgc cccggccgcgc gtcgttgcgc 169740  
 ttggccggatc acggccatc aatggatgttgc ttcgttgcgc tgcgttgcgc gtcgttgcgc 169800  
 cccggccatc cggccatccgc acggccatc ggcggccatc gacatccggccgc cattcccgcc 169860  
 gatccggccaa cccggccatc cggccatccgc acggccatc ggcggccatc gacatccggccgc 169920  
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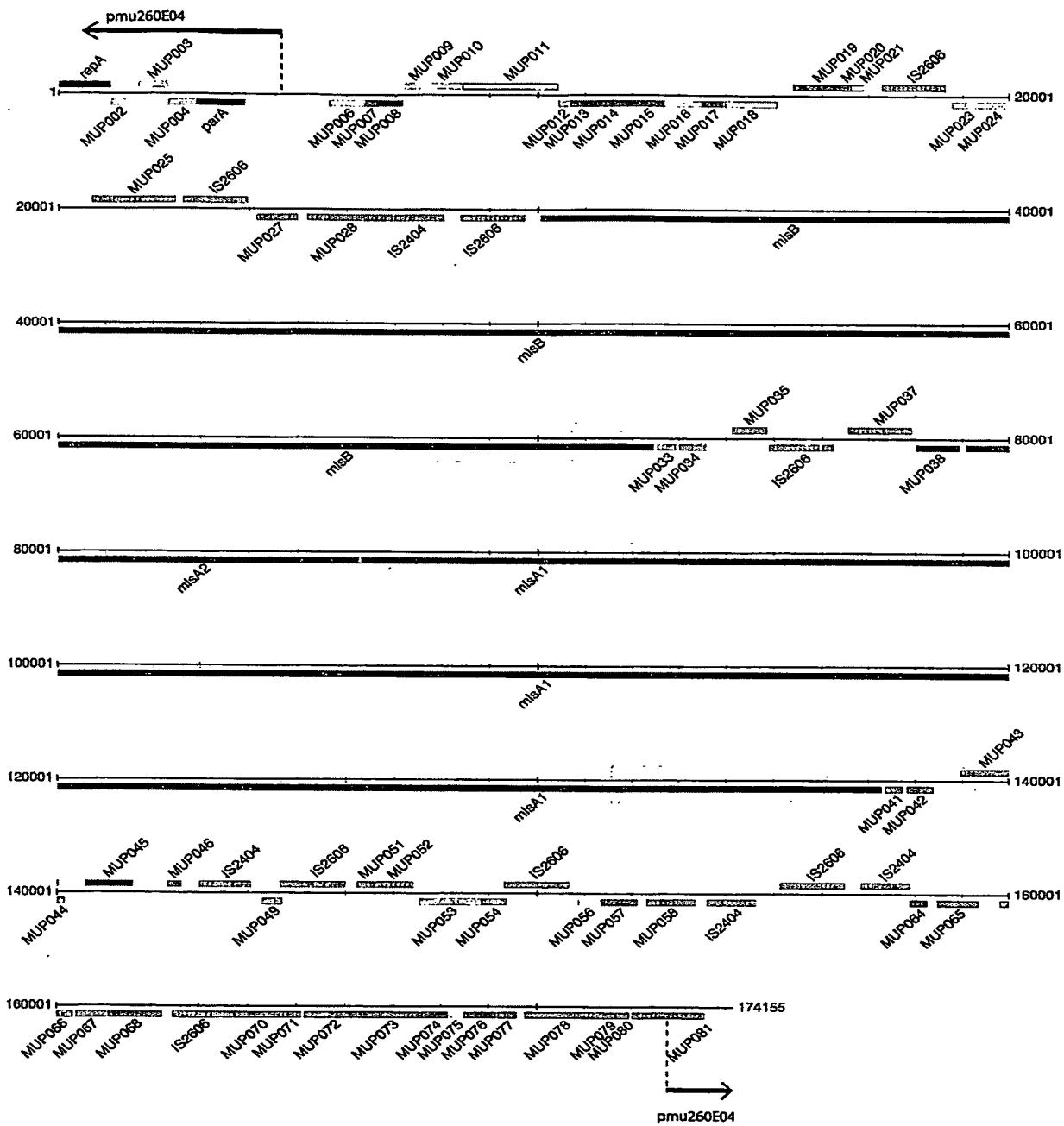
FIGURE 18(continued)

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accgacacca cctgcgccc caggctcggt aagcccgccc ccaccgccc tgccagcacc 170040  
 aaaaccaccc aacgcgccc cgagtcctc cgagtcgata tcgacgccc cggcgccagt 170100  
 caatcccgt gccaaccccg tcatccctt cgtggcttct tgagccaacc cttgcagctg 170160  
 ctgaccaagt ttttgtggta tttggccggc catggcaca cccgcgcccc gtgctccgt 170220  
 cagcatcgct ggcaccgctg aggccatacc aggttagagaa cccgcacccc cggctcccg 170280  
 cggtcagcgc gccaactcac catcgaccc caactcgctg aggtcgctgc tgcagcgtc 170340  
 gacgtcgctg tgcgtcggtc ctcgttgc tggccggat tggctggat tgggttctt 170400  
 ctcgctctga gttgtcggtc cccgctcggt cgtatcccc tgcgtcggtc caggttcaac 170460  
 aatggcgaa actggcgccg gggcccaaga aggtggccg ggaatctcac tcgtgtggta 170520  
 gccggggcc accacgtggg tgcggttggt caactggacg agattggcg gtgcctgaga 170580  
 caccggccg cgcagccccg gactcgggaa agagctgtt agctggatgg cggtttgcag 170640  
 ctcgcgtgc cgatgcgtg attccgcgtt ggttagcgctc gcatgcgttgc ctcaccgaa 170700  
 acggctttg tggccccccg cgtgtcgacc caccgttcg gcatagccgg ccatccctg 170760  
 tgcccagtgc gcatagcgat tcaacgcage actaatgcga gaaactgcct gacccgacag 170820  
 gtgttactg accgcgatgg cccgcgaccg cgccgacacc gacccctcac gaaagccctt 170880  
 cgacagcgcc ggcgcaccgc tcacaaacc atccccccg gccggccctgc cgccttcgat 170940  
 catggccgct tgggttccat caggctggc agccggccg gcatgcgtca ccccccggc 171000  
 cacaacatca ggggtcaccg cagacaccgg cgtggcggtt ggacggccgg gactgcccctg 171060  
 caaactcacc accgcccgtt ttgcttcgtc catggccca taccggcagcg ctgttgggt 171120  
 gatcgcttgg gtcggccctt ccaagacggc agccccatca agggcacgcg aggccaccac 171180  
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 atcatggctt gggccctgca acaccacgtt gtcgtactgc gtcataatcc ctcgaaacat 171660  
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 tcgcggactt gcaacccggc cggggaaatc ggtgcgttgc tggccgacc cgggtgggggt 172260  
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 tcttcgggggt tcttttgggg ggtctcggtt agaggatccaa cgtgtcgatc ggagtccagc 172560  
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 tcagaagcca gtcgtcgatc gagaggatccaa gtcgtcgatc gggccgttcc gccgcgtcg 172800  
 cccgttgcgtt gggccgcata gccggatcgat gttggccgtt ctggaggctt cccgtcgatc 172860  
 gccgggggtt cgtcgccgtt cgcgtatcg tgacggccgc ggtacggccg tgacaggcca 172920  
 tcaagtaccc ggcgtcgatc atcagatcg aacccacat tttcaacac gttgagaatg 172980  
 tcgcccgtt tggccctgcaaa gaaactcgatc agtgcgtttt ggcggccggg agtgtccaaat 173040  
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 tggccctcgatc cgtcgatcgat cgtatcgatc aacaccatcg cggcgatgtt gtcgtcgcc 173160  
 tcattaaatcg cccgtatcgatc acggatctt gtcgtatcgatc gacgttggcc ggcctcgcc 173220  
 gcagcgccac gaagctcggtt actgtctggg ttggggaggatc tcggccgtt ggtggtagga 173280  
 cgcggaggccg ggcggccggg aggccggcaca gacagcgatc gtcgtcgatc cagtcacccg 173340  
 ttgatctcgatc ttcgtccgttgc tgaatctggg ttcgtatcgatc ttcgtcgcc 173400  
 tccaaacggccg tggatgtatcg ttcgtcgatc gttggccgtt attcgcaccc atcatgcggc 173460  
 gatggggatc gggggaaaggatc ttcgtccgttgc acggatcgatc gtcgtcgatc cacttcggac 173520  
 agcactacat cggcccgatcc agtcatcgatc ggcacgatcc gacccacgtgc ggctcaggcc 173580  
 ctaccaacac cggccacatcc tccaaacccatc tccgtcgatc ctcgtcgatc cagggccggg 173640  
 tgactttatcg ttcgtccgttgc acacggccgc cccatcgatc ggtatcgatc cggagatgtt 173700  
 gtaacacttt gtcgtcgatc accacccatcg ccacccatcg gacggccatcg cccacgatc 173760  
 gacccagaac aattcaatcg ctcgtcgatc acggatcgatc ttcgtccgttgc gacccacgtgc 173820  
 aaggccccccaa aaggccgggg ctcgtcgatc agtttcgatc ctcgtcgatc ctcgtcgatc 173880  
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 catggccggatc agtcttcaccat ctcgtcgatc gtcgtcgatc ctcgtcgatc ctcgtcgatc 174000  
 cggcaggccgatc ctcgtcgatc acggatcgatc ttcgtcgatc ctcgtcgatc ctcgtcgatc 174060  
 gacccacccatcg ctcgtcgatc acggatcgatc ttcgtcgatc ctcgtcgatc ctcgtcgatc 174120  
 ctttcggccatcg ttcgtcgatc acggatcgatc ttcgtcgatc ctcgtcgatc ctcgtcgatc 174155

FIGURE 18(continued)

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**FIGURE 19**

**MUP081**

CCCAGCCAGTCAT gtcgcga [REDACTED] ggctcaggcgctaccaacaccgc 173592  
 cacattctccaagccactccgagacaccgcttgc [REDACTED] 173652  
 cttctcgacacgcccacatacgcggtagtaccgcgagagtggtaacacttgct 173712  
 [REDACTED] accaccagaagaaggcgatgcccacgagctgacgcagaacaat 173772  
 tcaatagcactcaacaaccggtagatcacccatctgaagcgacaaaagccccccaaa 173832  
 ggcggggcctgtctcagttcaaccgagtaggcgctcggtctgggtttcaccgt 173892  
 a [REDACTED] 173952  
 [REDACTED] cgccgcgcgccttgcgc [REDACTED] 174012  
 ttgcgcgcaccgtttgcgcgcgttgcgcgcgttgcgcgcgttgcgcgcgttgcgcgcgt 174072  
 ggcgcgcgcgcgttgcgcgcgttgcgcgcgttgcgcgcgttgcgcgcgttgcgcgcgt 174132  
 ctgcgcgccttcggccaagatATGCCAGCACCAGCGTGTGTCGGCCTGGAACTCCG 37

**repA**

FIGURE 20

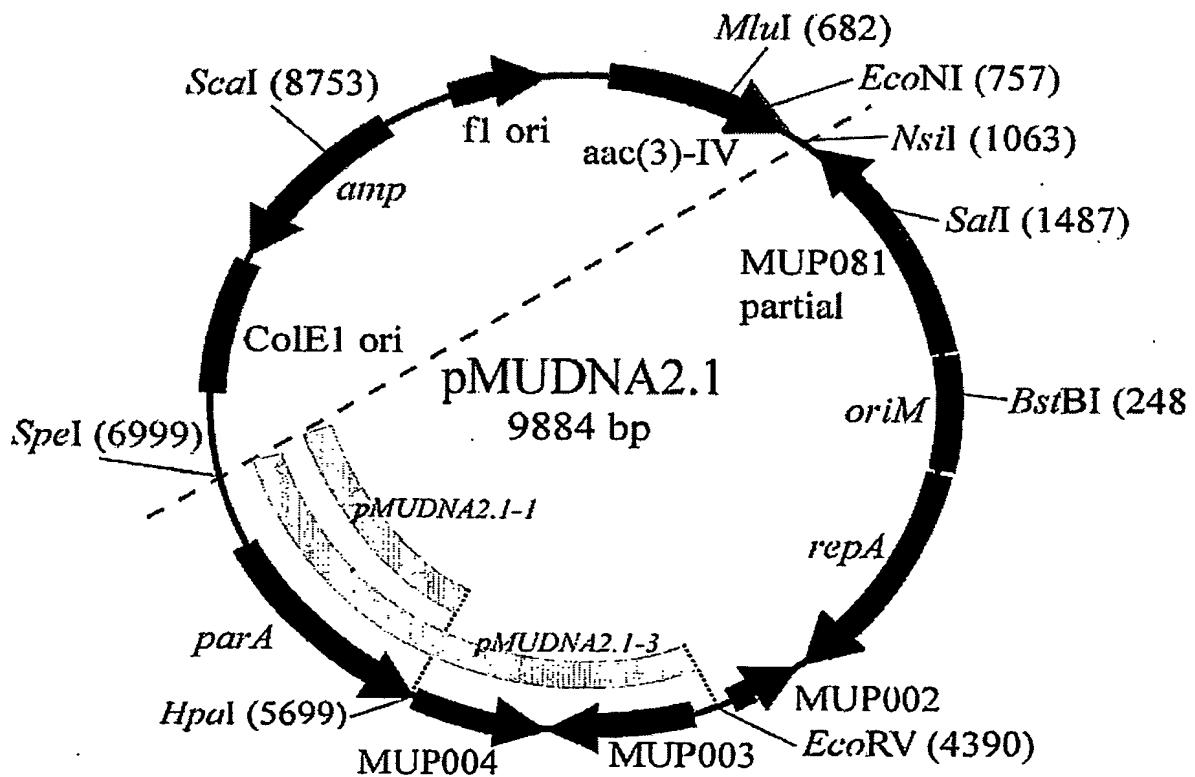


FIGURE 21

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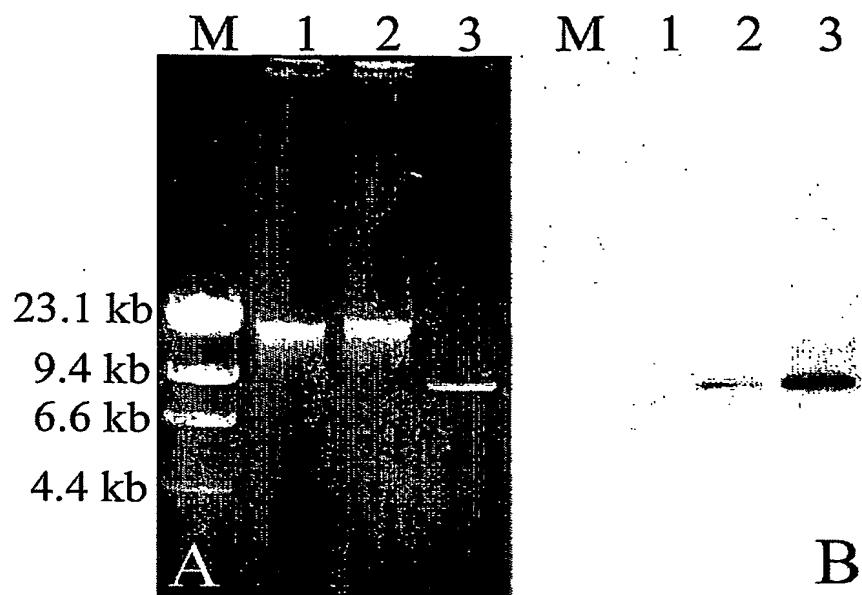


FIGURE 22A

FIGURE 22B

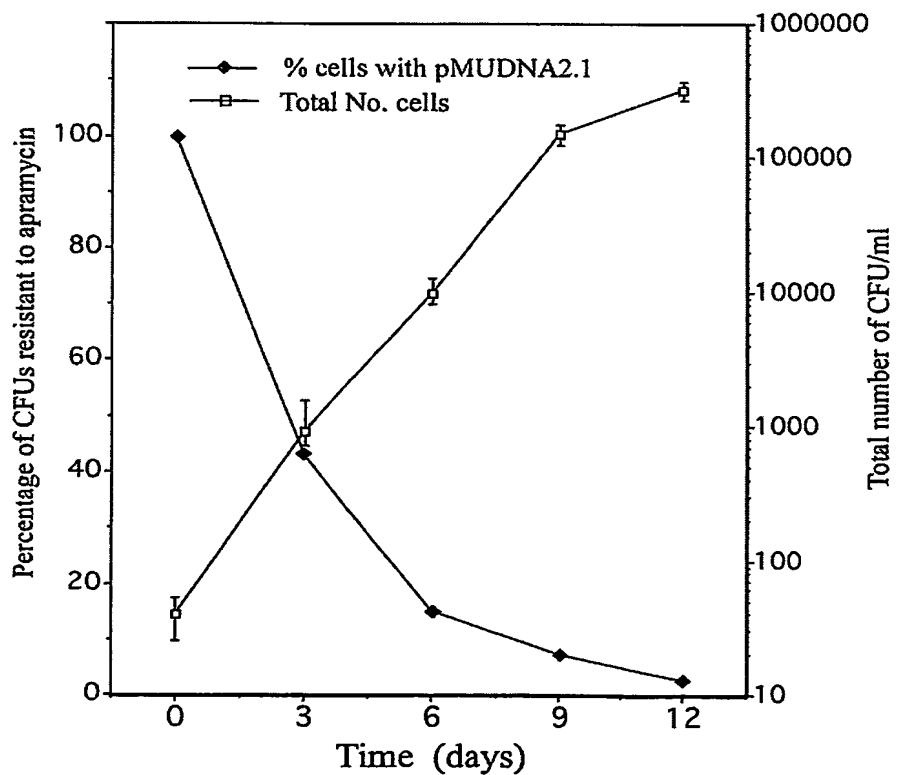


FIGURE 23

AGCGCAGGGCGGGTCCCCAGGCAGGGC...GCCCTGGGTGCCCAAGGTATGGCT [SEQ ID NO.:59] 10 bp  
 CGGCGCGGGTTGCTGCGGGCGGCAGGGC...GCCCTGCGCGGGCAAGTCGG [SEQ ID NO.:60] 10 bp  
 AACACCGCATTCCCCGGTCACCCAGGGC...GCCCTGCGGGTCACCGGCCGCCG [SEQ ID NO.:61] 10 bp  
 GGCAACGGATCTAGCCGGGTGCAGGGC...GCCCTGAGCCGGGTGCAGTCGG [SEQ ID NO.:62] 10 bp  
 CGAGGCCATGCCATGCCGCCGAGGGC...GCCCTGCATGCCGCCGAACCT [SEQ ID NO.:63] 10 bp  
 ACGATGCCGGAGAATCTCAGCGCAGGGC...GCCCTGAATCTCAGCGCCGGGG [SEQ ID NO.:64] 10 bp

FIGURE 24

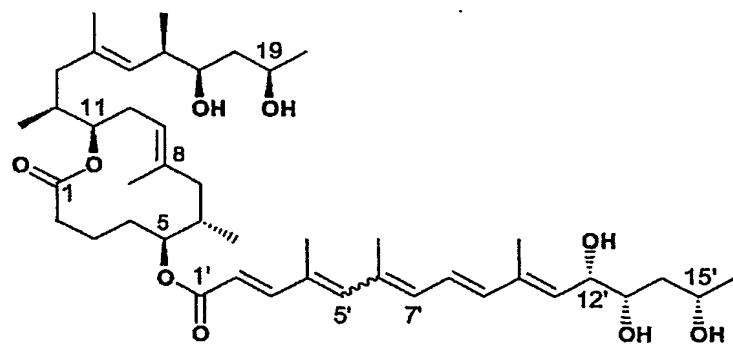
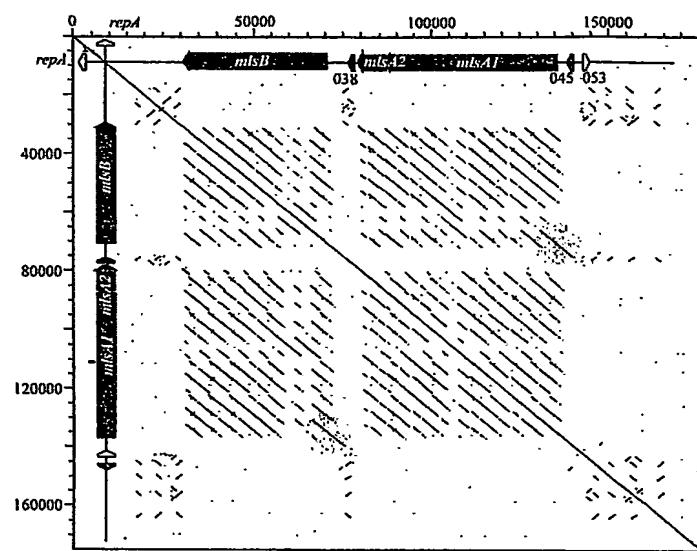
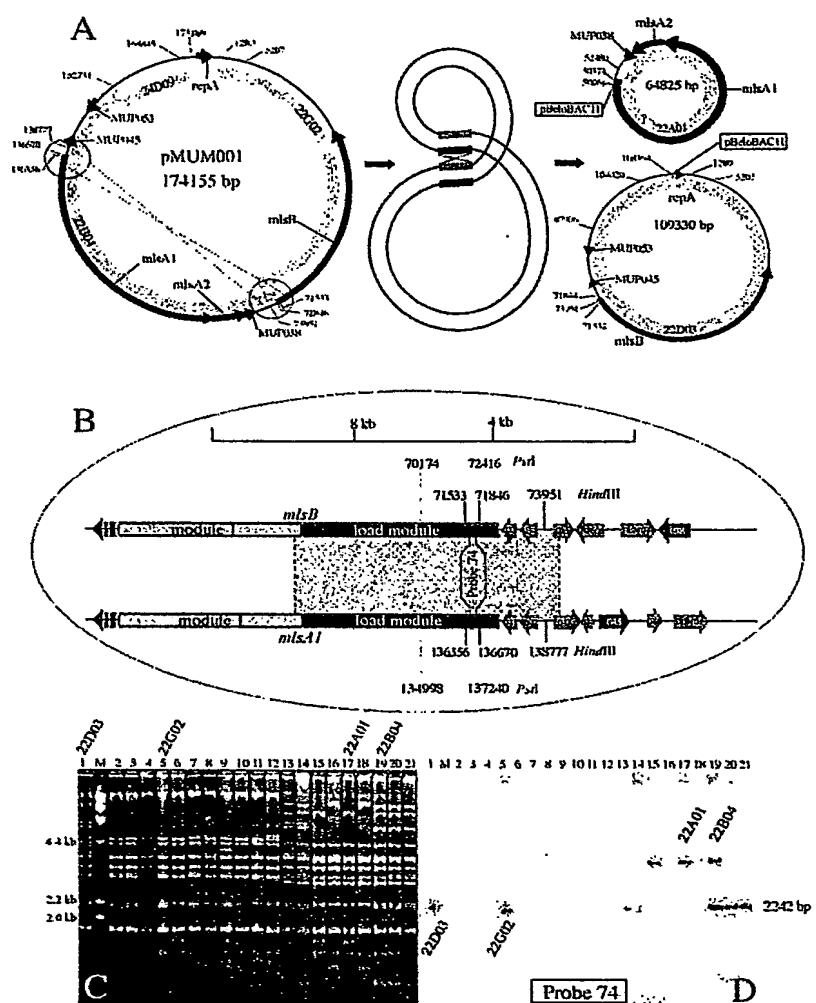


FIGURE 25

**FIGURE 26**



**FIGURE 27A - FIGURE 27B - FIGURE 27C - FIGURE 27D**

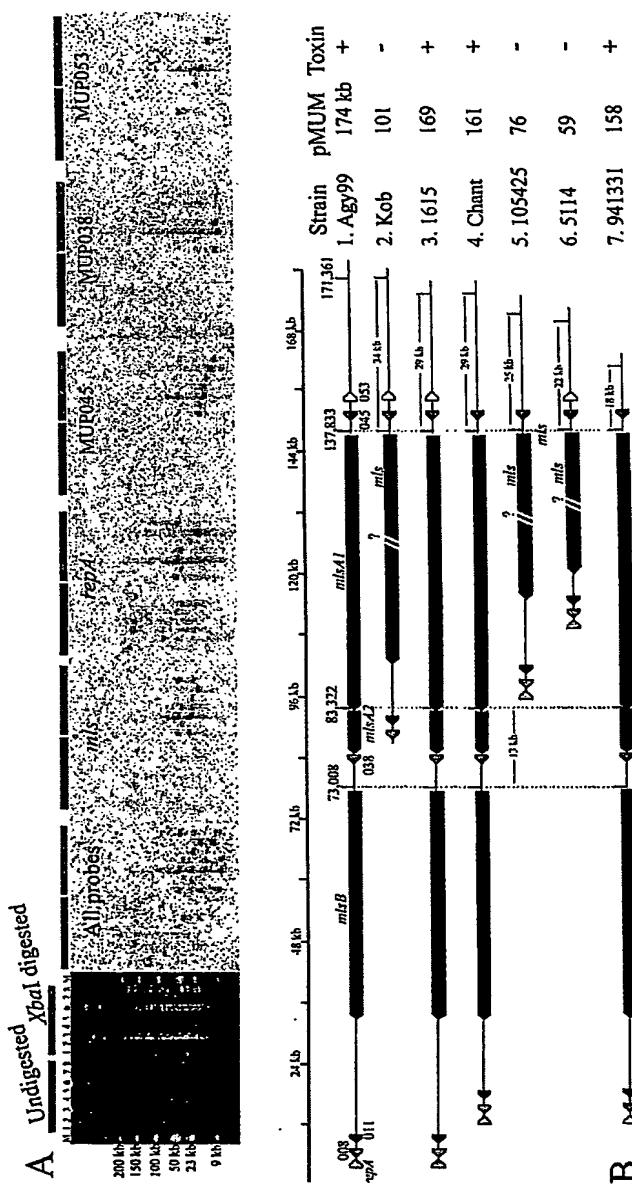


FIGURE 28A

FIGURE 28B

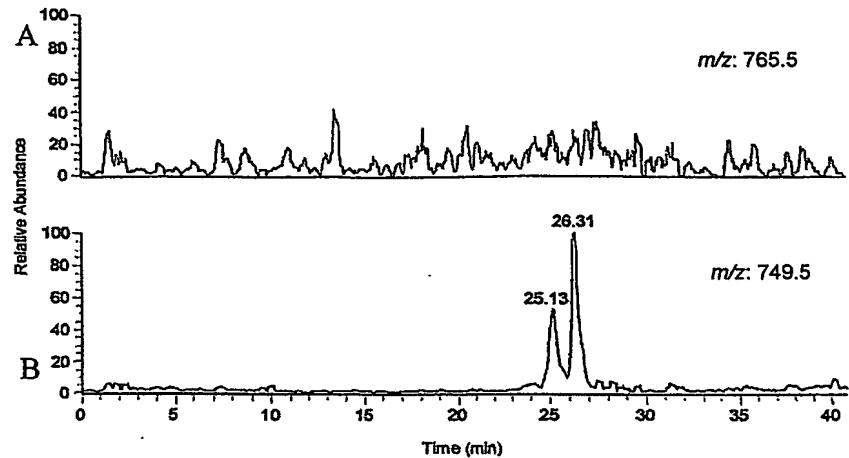


FIGURE 29A - FIGURE 29B

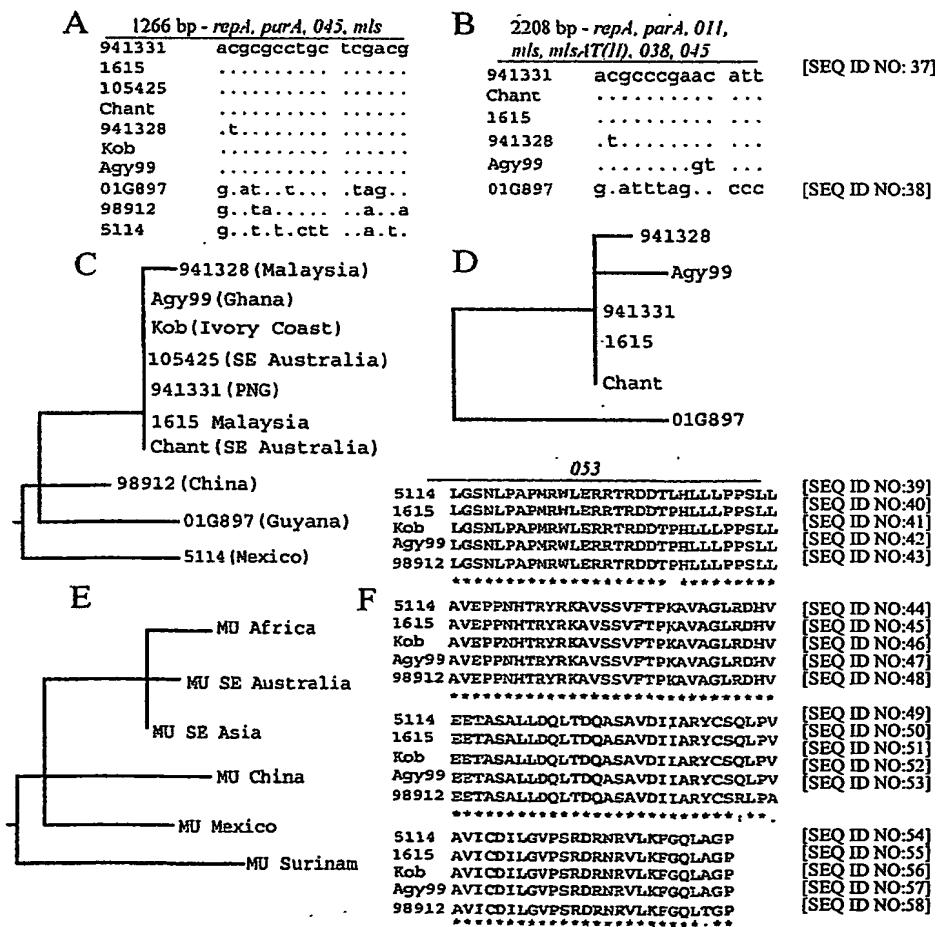


FIGURE 30A - FIGURE 30B - FIGURE 30C - FIGURE 30D - FIGURE 30E - FIGURE 30F

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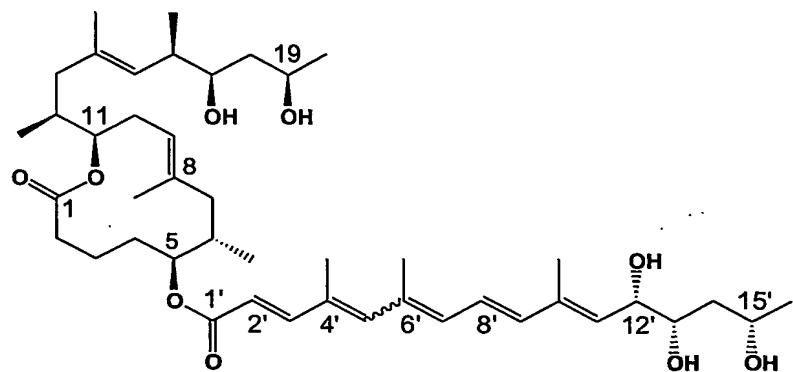


FIGURE 31A

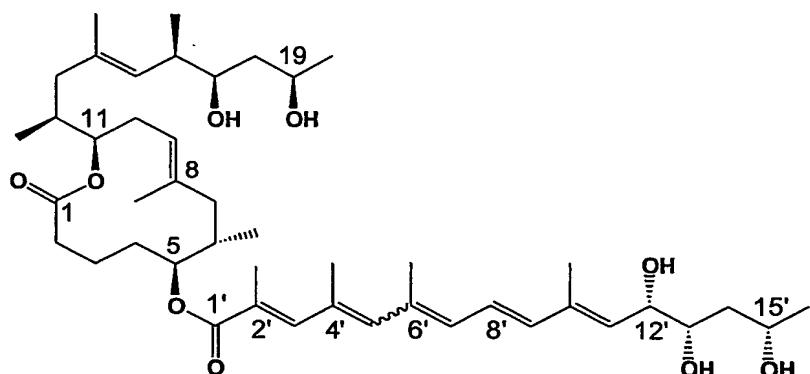


FIGURE 31B

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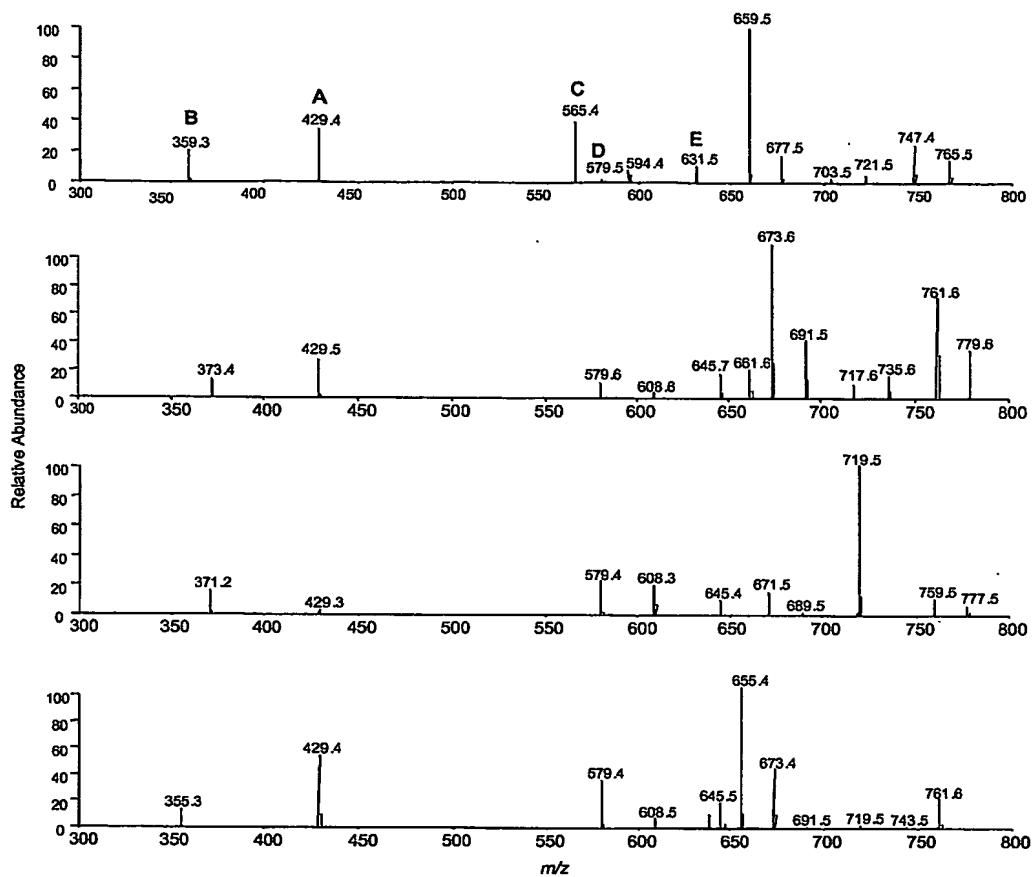


FIGURE 32

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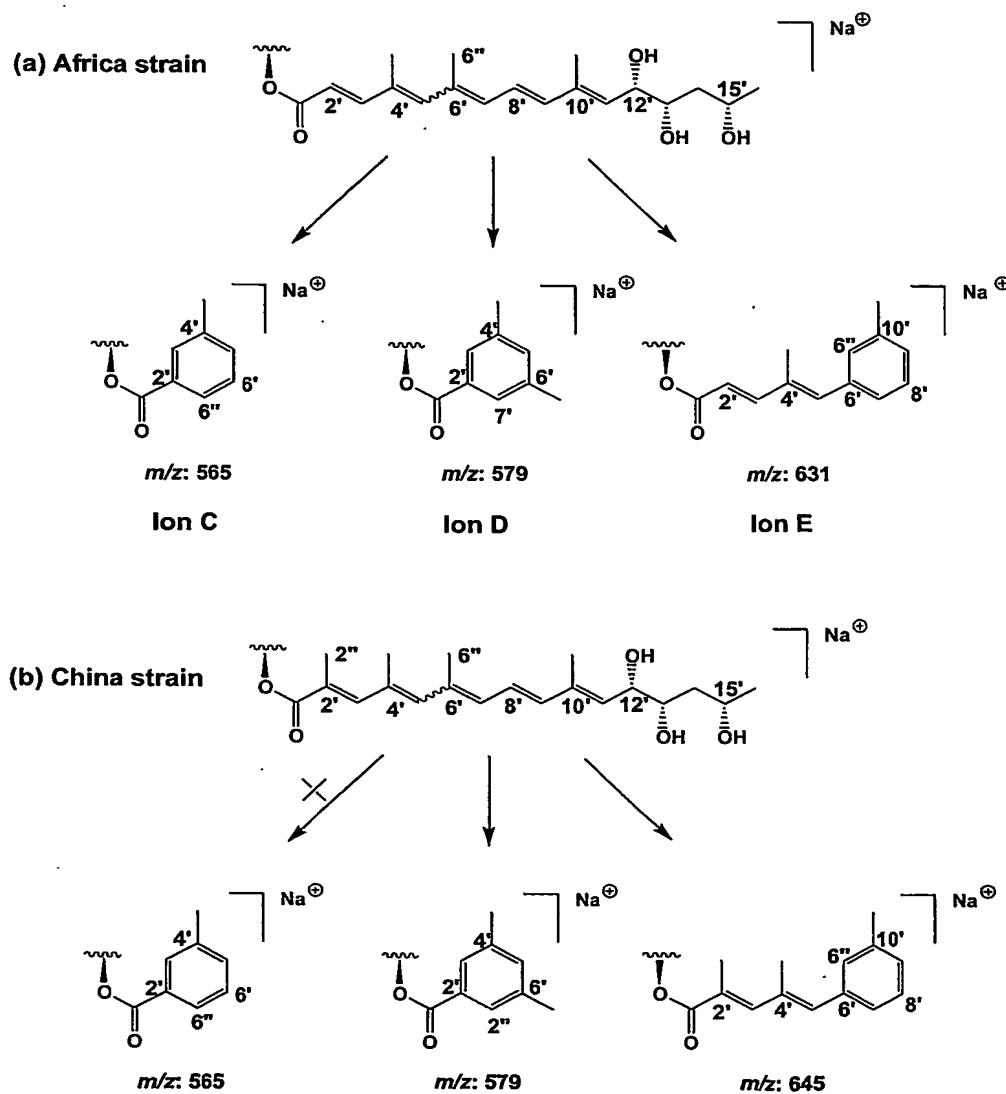


FIGURE 33

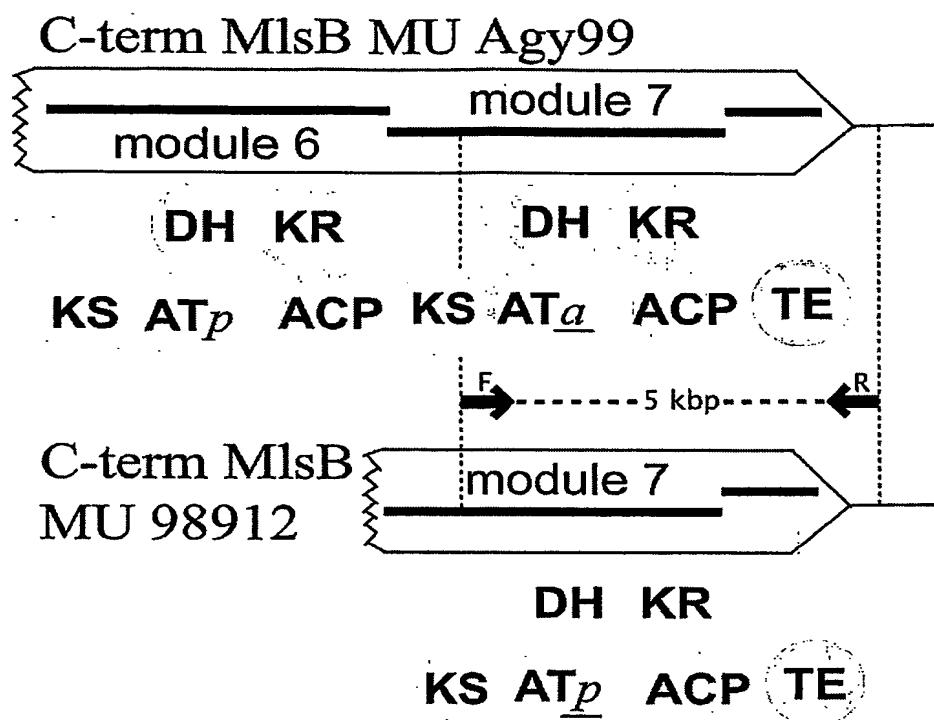


FIGURE 34

Agy99 - AT6	PHRATITTSIEHHSENNDTTDALAALHALANNGTHPLLSRGLLTPQGPCKTVFVFPGQC
98912 - AT7	PHRATITTSIEHHSENNDTTDALAALHALANNGTHPLLSRGLLTPQGPCKTVFVFPGQC
Agy99 - AT7	PHRATITTSIEHHSENNDTTDALAALHALANNGTHPLLSRGLLTPQGPCKTVFVFPGQC
*****	
Agy99 - AT6	SQYPMGMGADLYRQFPVFAHALDACDAALQPFTGWSVLAVLHDE -- PEAPSLERV/DVVQF
98912 - AT7	SQYPMGMGADLYRQFPVFAHALDACDAALQPFTGWSVLAVLHDE -- PEAPSLERV/DVVQF
Agy99 - AT7	SQYPMGMGADLYRQFPVFAHALDEAAALNPHLDVALLEVMFSQODTAMAQLLDQTFYAOF
*****	
Agy99 - AT6	VLF SVM VSLAALWRWAGITPD AIGH SQGE AAAH VAG ALTLPEAAAVV A I RSRV LTD L A
98912 - AT7	VLF SVM VSLAALWRWAGITPD AIGH SQGE AAAH VAG ALTLPEAAAVV A I RSRV LTD L A
Agy99 - AT7	ALF ALGT ALHRL FTHAGIHPDYL GH S I G E L T A A Y A A G V L S L O D A A T L V T S R G R L M Q S C I
*****	
Agy99 - AT6	GAGAMASVLSPEEPLTQLLARWDGKITVAAVNGPASAVVSGDTTAITELLITCEHENIDA
98912 - AT7	GAGAMASVLSPEEPLTQLLARWDGKITVAAVNGPASAVVSGDTTAITELLITCEHENIDA
Agy99 - AT7	PGGTM LALQASEAEVQPLLEG LD HAVSIAINGAT SIVL SGD HDS L E Q I G E H F I T Q D R R T
*****	
Agy99 - AT6	RAIPVLYPSHS PYMEH IRHQFL DELPEL P R P S T I A M Y S T V D G E P H D T A Y D T T M T A D Y W
98912 - AT7	RAIPVLYPSHS PYMEH IRHQFL DELPEL P R P S T I A M Y S T V D G E P H D T A Y D T T M T A D Y W
Agy99 - AT7	TRLQVSHAFHSPHMDPILEQFRQIAAQLTFSAPTLPTLSNLTG -- QIARHDQLASPDY W
*****	
Agy99 - AT6	YRNIRNTVRFHDTVAALLGAGEQVFLELS PHPVLTQAITDTVEQAGGGAAVPALRKDRP
98912 - AT7	YRNIRNTVRFHDTVAALLGAGEQVFLELS PHPVLTQAITDTVEQAGGGAAVPALRKDRP
Agy99 - AT7	TQQLRNTVRFHDTVAALLGAGEQVFLELS PHPVLTQAITDTVEQAGGGAAVPALRKDRP
*****	
Agy99 - AT6	DAVAFAAALGQLHCHGISPWNVLYCQARPLTLPTYAFQHQRWLLPTAGDFSGANTHAM
98912 - AT7	DAVAFAAALGQLHCHGISPWNVLYCQARPLTLPTYAFQHQRWLLPTAGDFSGANTHAM
Agy99 - AT7	DAVAFAAALGQLHCHGISPWNVLYCQARPLTLPTYAFQHQRWLLPTAGDFSGANTHAM
*****	

FIGURE 35

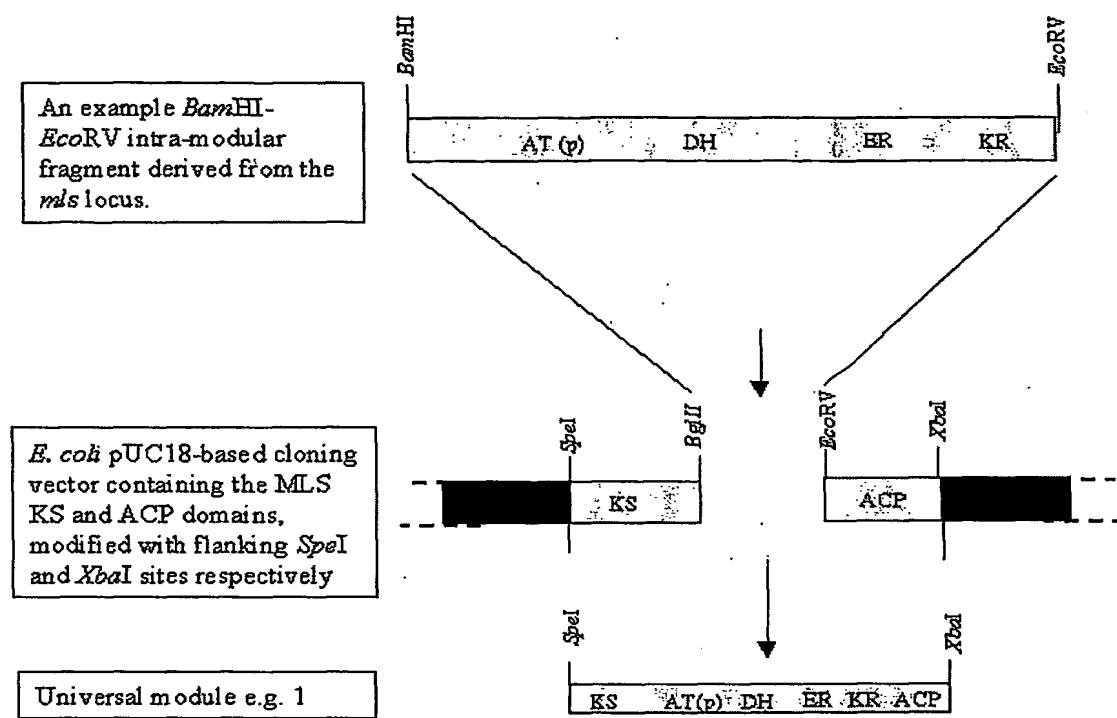


FIGURE 36

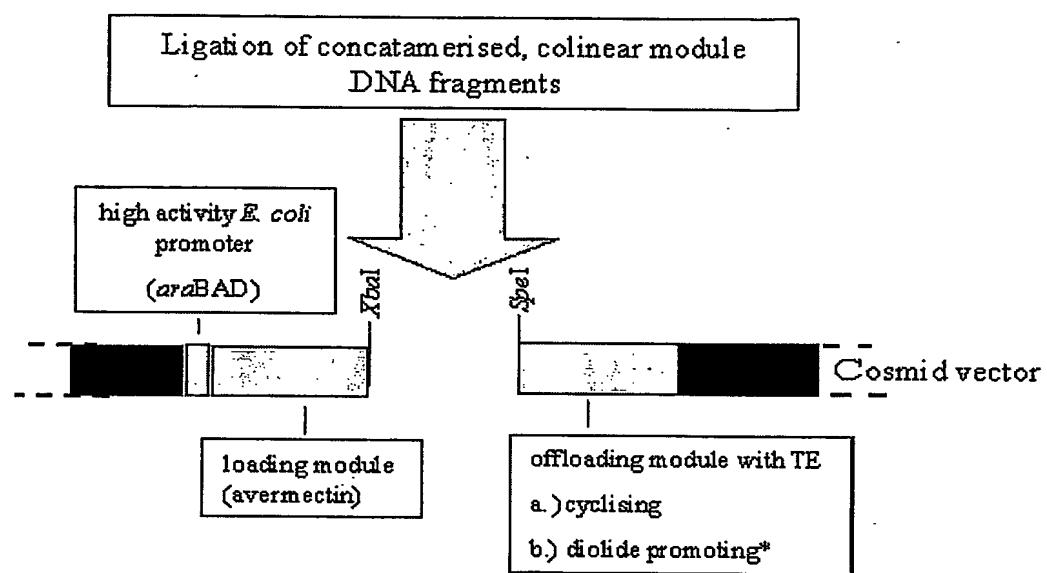


FIGURE 37

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